MAY 1956 Vol. 18 No. 6

MINING WORLD

What Aerofall Grinding Proved in S. Africa

Miscovich Brothers Make Alaska Placer Pay

New System Sets Carlsbad Sinking Records
Page 42

50 cents a copy—3s 5d in sterling

WEMCO S-H CLASSIFIERS

SPIRAL DIAMETERS

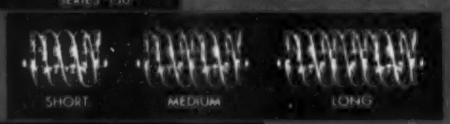
SPIRAL PITCH — for sand removal capacity.

SPIRAL PITCH — for better settling conditions.

STYLE OF TANK

POOL DEPTH

SPIRAL LENGTH



ASSEMBLIES

SPEED OF SPIRALS

LIFTING DEVICE

WIDELY CHOSEN AND PLENTY OF CHOICE

Large operators world over choose Wemco S-H Classifiers — for a number of technical reasons like performance, structural strength and simplicity of design — but also for another reason just as important: **From WEMCO they can always get exactly the right machine for any specific need.** For your plant, too, no matter what its size or its circuits, you also will find exactly the right classifier in the many options that Wemco offers.

Write for bulletin C1-52

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WESTERN MACHINERY COMPANY

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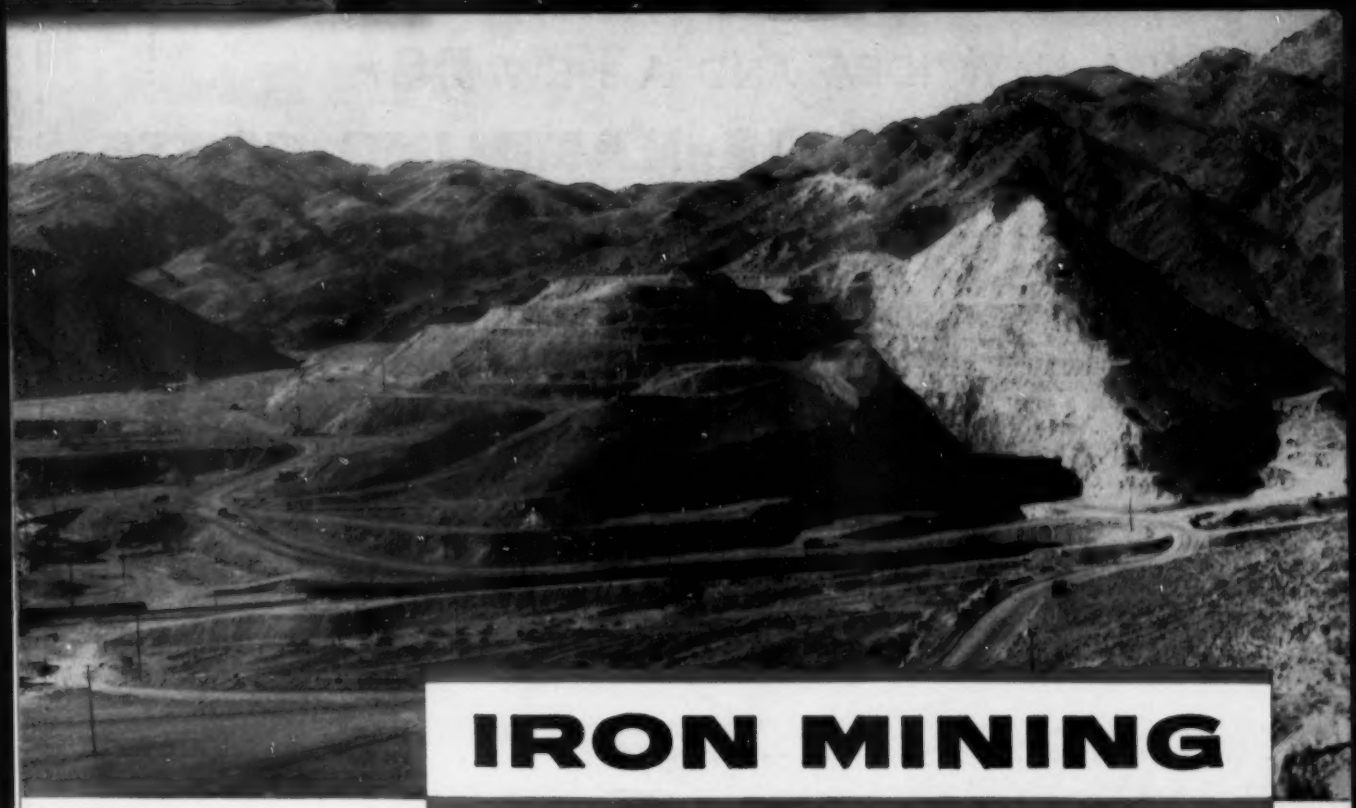
Representatives in principal cities of the United States and Canada and in major countries throughout the world.



General view of Kaiser Iron Mine at Eagle Mountain, California.

IRON MINING
In California

Kaiser Steel Uses "Eucs"

IRON ORE for the big Kaiser Steel plant at Fontana, California, comes from an open pit mine in the Eagle Mountains between Indio and Blythe. Mining operations began in July of 1948 with 11 Rear-Dump "Eucs" of 15-ton capacity removing overburden, stockpiling low grade material and hauling top grade ore from loading shovels to the main crusher.

22 ton "Euc" with quarry body being loaded by 5 cu. yd. shovel.

Performance of the original Euclid fleet was so dependable and efficient that Kaiser now uses 15 "Eucs" of 22-ton capacity with 5 of the 15-ton units. Loading shovels have 4½ and 5 cu. yd. buckets . . . hauls from bench to crusher have long grades of minus 8%. Despite big loads and steep downhill hauls, speed is controlled without excessive use of the service brakes by means of retarding units that maintain maximum safe travel speeds at all times.

Dumping 22 tons of ore into crusher for processing and rail shipment to Fontana Plant of Kaiser Steel Corporation.

If you have a problem of moving large tonnages on tough off-the-highway hauls, ask your nearby Euclid distributor for helpful facts and figures. He may be able to help you reduce costs, and besides, he's a good man to know!

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

HOW A NEW IDEA AND A NEW D8 CUT MATERIALS-HANDLING COSTS

This new CAT* D8 Tractor is hard at work in one of the sulphur vats in the Texas-Louisiana Gulf Coast Area. Note the special sideboards and extended blade on the No. 8U Bulldozer, which also has back-rip teeth. This rig breaks down vats of sulphur and handles in excess of 400 tons per hour of the light material.

The new D8 handles sulphur more quickly and inexpensively than was possible with the old method of blasting. In addition to saving several hundred cases per month of blasting material and eliminating other expensive related operations, the new Caterpillar D8 Tractor with 'dozer breaks up sulphur lumps and does away with hand picking.

Why was Caterpillar selected? First, because of the close co-operation of the local Caterpillar Dealer in developing this special sulphur-handling 'dozer. Second, because of the excellent performance of other equipment built by Caterpillar, which is used almost exclusively by this producer.

The new Caterpillar D8 Tractor is designed to outwork and outlast any previous crawler. Its new 4-cycle Caterpillar Diesel Engine develops 191 HP. New seven-roller track frame and "water-quench" hardened track shoes give even longer work life. Hydraulically boosted steering, "in-seat" starting and superb visibility give the operator greater efficiency and convenience. The D8 is available with torque converter (Series D) or exclusive oil clutch (Series E) to suit *your* job.

See your Caterpillar Dealer for full details. And count on him for dependable parts and service.

Caterpillar Tractor Co., San Francisco, Calif.; Peoria, Ill., U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

Mining World

Including the Export Edition **WORLD MINING**

Published monthly except in April when publication is semi-monthly

VOLUME 18 — **MAY 1956** — No. 6

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ON THE COVER: Mucking out the round at the bottom of National Potash Company's No. 2 shaft near Carlsbad, New Mexico. The mucker operator controls the action of the clamshell from the electric control panel strapped around his shoulders. Air hoists, on surface, are actuated from panel making the shaft bottom free of noise, fog, and confusion.

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WORLD MINING is published the 26th of each month as a regular department of MINING WORLD and is also circulated as a separate publication on a carefully controlled free basis to a selected list of management and supervisory personnel associated with active mining enterprises throughout the world.

MILLER FREEMAN PUBLICATIONS

GRAB SAMPLES From the Mail

What Is Cover Origin?

I have enjoyed your strikingly "modern" cover designs on the Yearbooks of the past two years enormously. My feelings have been that most industry magazines look too industrial. MINING WORLD is an outstanding exception.

Incidentally, what is the origin of the small vignette of ancient smelting which appears in the lower right hand corner of the cover of the latest issue?

W. A. SMITH
ThorUranCo, Inc.
Ambrosia Lake, New Mexico

The illustration on the front cover of the 1956 Yearbook Catalog Survey & Directory Number of MINING WORLD was taken from an ancient Egyptian tomb carving. This is the earliest known picture of a combination hand and foot operated goat intestine bellows used in the smelting of non-ferrous metals.—ED.

Dear Sir:

I would like to give a more detailed report and interpretation of the geology of the Kilo-moto gold mines in the Belgian Congo than was given in your February 1956 issue. (Gold: How It's Mined and Milled By Kilo Moto In Belgium Congo, pages 60, 61, 62, February 1956, MINING WORLD).

According to former hypotheses the Kibali group which consists of metamorphic Precambrian rocks, was the center of an extensive phenomenon of granitic intrusion. It would form a relatively thin mass resting on the batholith. Important lava intrusions would have penetrated this Kibali formation, so that the metamorphic rocks of which it is constituted would be in a larger proportion of eruptive rather than of sedimentary origin. The gold veins would be found in the neighborhood of the confining zones between the batholith and the Kibalian schistoid zones.

It may be noted that observations made during these last years do not quite seem to agree with these ideas.

The rich gold deposits of Durba, Agbarabo and Gorumbwa show a structure of impregnation without any relation to quartz veins. Mr. F. Kaisin Jr., Consulting Geologist, proved that in Durba, silicification is a general secondary phenomenon. The removal of the silica there plays a surprising part. What renders the case more acute is that diamond drilling results are showing deep rocks types which are greatly different from those near the surface; this doesn't tend towards the classic zones of metamorphic anureole. The supposed batholith is not approached.

Mr. P. Duhoux demonstrated that the front of the granitization takes place respecting the structure of the Kibalian rocks, including the diaclases, with a "cutting out" that excludes the extrusive collocation. Dr. Sorotchinsky, with petrographic arguments collected during many years, showed the secondary character of

Continued on page 76

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How Tractor Operators **Save 50% on Parts Replacement Costs**

Build-up and hardfacing with Amsco® Automatic Welding saves money, doubles service life

The operator shown here is depositing Amsco AW-79 . . . to build up cash savings for tractor operators.

By rebuilding and hardfacing with Amsco Automatic Welding, he is adding *double the service life* of the original part . . . at about *half the cost* of a replacement part.

The Amsco "550" Automatic Welder is specially designed for this heavy-duty service. And Amsco AW-79 Alloy Steel Electrodes provide high impact and abrasion resistance.

Both large contractors and repair shops can make the Amsco "550" pay for itself in short order. Ask your Amsco Distributor for full details on the "550" Automatic Welder and the full line of Amsco Hardfacing Electrodes.

Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

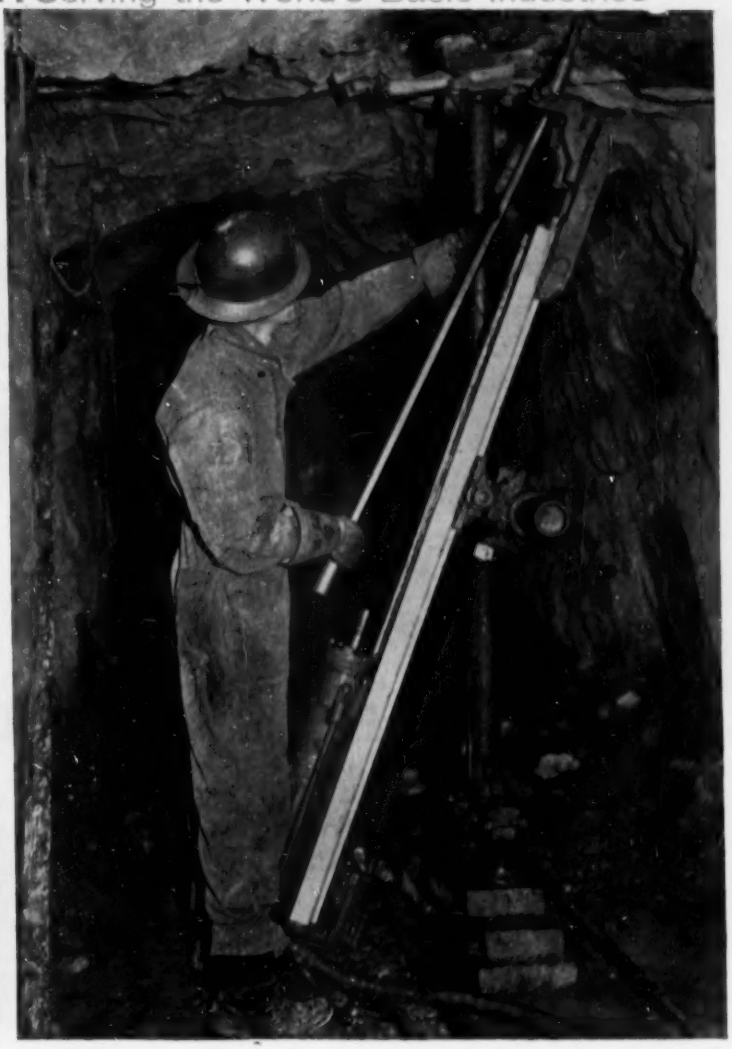
AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DELAWARE, OAKLAND, ST. LOUIS; JOLIETTE, QUEBEC

Gardner-Denver . . . Serving the World's Basic Industries



Reduce ore breakage costs by 50% to 75% with Gardner-Denver Deep Hole Drills

Permit ring drilling to 100 feet or more from a 7-foot development drift. Also for bench holes, stoping, slashing, pillar recovery.

Engineered deep hole equipment includes 4" or 4½" drills, long feed aluminum guideshells, Ring Seal Shank, sectional rods and couplings, bit adapter for carbide bits.

Send for illustrated bulletin on deep hole drilling . . . it's packed with application reports and equipment specifications.

GARDNER - DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois

Export Division: 233 Broadway, New York 7, N.Y., U.S.A.

One of the 6 dredges offered. Digging depths range from 35' to 80' below water level; buckets from 8½ to 18 cu. ft.

6 YUBA DREDGES

AVAILABLE FOR PRACTICAL PROJECTS

WORTH $6,000,000 NEW. YOU CAN BUY ANY OR ALL AT FRACTION OF REPLACEMENT COST, ON SURPRISINGLY FAVORABLE TERMS.

With These Dredges You Can Economically Mine...

Platinum	Gold	Titanium
Monazite	Chromium	Zirconium
Tungsten	Garnets	Sapphires
Diamonds	Thorium	Uranium

Tin... and other minerals found in placer deposits.

Or Use for Such Construction Projects as...

Erecting flood control levees
Changing stream channels
Building canals and cofferdams
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Producing aggregate
Working beach sands

Money and Time Saving Possibilities

You can put any of these dredges to work on your project many months earlier than a new outfit... and certainly at decided savings in costs.

All 6 dredges have been proved in gold field operation and are available only because ground is worked out. They can be remodeled to meet your exact work needs.

Extremely Flexible Terms

You'll find us easy to deal with. If you're a responsible person with worthwhile projects, we'll be happy to discuss royalties, lease, stock participation or other highly flexible, mutually agreeable terms.

Don't Delay!

Don't delay. Take advantage now of this opportunity to get a job-proved dredge, at big savings, on extremely flexible terms. Fill in coupon and mail TODAY for your copy of 8-page folder picturing and describing these 6 Yuba Dredges.

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Yuba Consolidated Gold Fields
351 California St., San Francisco 4, Calif.

I'm interested in a dredge for mining or excavating _____

_____

Please send folder "6 Yuba Dredges."

Name _____ Title _____

Company _____

Street _____ City _____

Country _____ Phone No. _____

POWERHOUSE ...one D397 does it all!

In one of the world's largest phosphate beds, near Soda Springs, Idaho, this CAT* D397 Electric Set is the main source of power for the crushing plant shown here. Output of the crusher, owned by Morrison-Knudsen Co., Inc., is 1000 tons per eight-hour day of 1½"—⅜" quartzite. The crushed quartzite is raw material used in Monsanto Chemical Company's nearby elemental phosphorus plant.

The D397 Electric Set furnishes power for a 125 HP motor on the Simmons cone crusher, a 100 HP motor on the Cedarapids jaw crusher, and nine motors totaling 172½ HP on conveyors and vibrator screens.

Now there is a new Caterpillar D397 Electric Set with Turbocharger, developing 350 KW. It is self-regulated for easy, adjustment-free operation and steady voltage. It incorporates Caterpillar's amazing new generator, which exactly matches the D397 Engine powering it.

Reliability and long life are important in an electric set, which is often called upon for continuous operation. The Caterpillar D397 has both, with such features as aluminum alloy bearings, "Hi-Electro" hardened crankshaft and cylinder liners. It also has highly effective oil and air filters designed to protect the engine's Caterpillar-built precision under even the dustiest conditions.

There is a complete line of Caterpillar portable and stationary Electric Sets, up to 350 KW. Your Caterpillar Dealer — who provides skilled service and parts you can trust — has full details on the engine or electric set best suited to *your* operation. See him today.

Caterpillar Tractor Co., San Francisco, Calif.; Peoria, Ill., U.S.A.

CATERPILLAR*

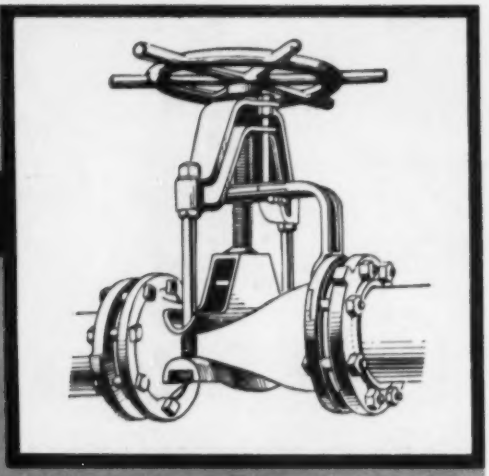
*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

MODERN HEAVY-DUTY ELECTRIC SETS

MASSCO-GRIGSBY PINCH VALVES

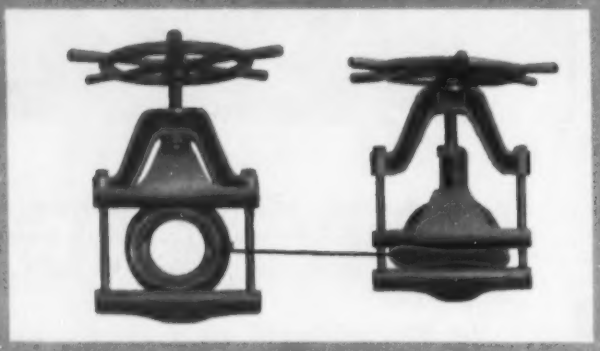
rubber and neoprene

for ABRASIVE and CORROSIVE PULPS and LIQUIDS



now available with lighter-duty sleeves

The 3, 4, 5, 6 and 8 inch sizes are now available with rubber sleeves for pressures up to 50 lbs. per sq. in., for lighter-duty service. Where applications do not require the standard 150 lb. pressure sleeves, these have the advantage of lower cost and easier operation. They are interchangeable with the 150 lb. sleeves.



...IT'S HINGED... for longer wear

Recesses molded into opposite sides of the sleeve serve as "hinges" during compression. This patented feature prevents undue strain and eliminates breakage and excessive wear due to valve adjustments.

Advantages . . .

- Long life under severe conditions
- Unobstructed flow passage
- Positive closure on solids
- No working parts in contact with pulps or liquids
- No packing glands
- Minimum friction loss
- Minimum pressure loss
- Cannot leak or stick
- Resistance to oils
- Resistance of the special rubber sleeve to abrasion and corrosion is greater than that of the metallic interior parts of gate valves or plug valves.
- Only ONE wearing part
- Withstands all chemicals not harmful to rubber or neoprene
- Withstands temperatures to 180° F.
- Freezing temperatures are not harmful.

The Mine & Smelter Supply Co.

Denver • Salt Lake City • El Paso • New York

Representatives in Foreign Countries

SIZES:

1", 2", 3", 4", 5", 6", 8", 10", 12", 14"

Handy Tournatractor services 3 shovels over widely scattered work area in 6000′ x 4000′ limestone pit. It pushes in shallow toe ahead of shovel for faster loading. It's fast enough to follow the dipper in and out to clean-up truck and dipper spillage.

2 rubber-tired tractors

. . . clean-up around shovels
. . . doze rock between shovel swings
. . . service 10 to 12 crushed-stone stockpiles
. . . make 2-mile swing service cycles

At Material Service Corporation's Thornton, Illinois quarry—the largest commercial quarry in the world—over 3,000,000 tons of limestone are removed yearly. To speed shovel clean-up, dozing, and other jobs at this huge 6000′ x 4000′ pit, Material Service Corp. uses 2 fast, 19 mph, rubber-tired, 208 hp Tournatractors.

Make 2-mile swing cycle

A major advantage of the rubber-tired Tournatractor on this assignment is its ability to travel fast at speeds to 19 mph, from shovel to shovel . . . scattered .2, .9 and 1 mile apart . . . making a swing cycle for clean-up service of over 2 miles. Instant-shift, constant-mesh transmission enables this big rubber-tired dozer to move in fast and back away in a hurry, without delaying the shovel cycle. Between shovel swings, the versatile tractor dozes in scattered rock to keep material in good shovel-loading position . . . also pushes back toe of blasted material from bank ahead.

Tires eliminate abrasive wear on multiple track parts

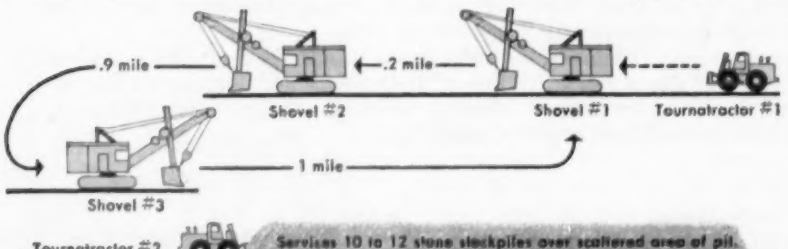
Big, low-pressure rubber tires with heavy ground-gripping action make Tournatractor safe and sure-footed. Tires roll *over* abrasive materials . . . do not grind *in* them. They cushion the ride for the operator, and reduce maintenance to a minimum, because 4 wheels do the work of some 500 wearing parts in a crawler-tractor's track mechanism.

Power from the Tournatractor's 208 hp diesel moves on high-speed, anti-friction bearings sealed in oil. With this all-gear drive you have no chains or tracks to stretch, snag, or wear. Power goes direct from transmission to drive wheels. As a result, there are less friction losses and wear due to hundreds of open parts grinding in dirt or abrasives.

Before you buy a tractor for your clean-up, dozing, servicing, maintenance, or other jobs, investigate the high speeds, lower maintenance, and greater mobility that Tournatractor can give you. It frequently replaces 2 or 3 crawlers in one pit!

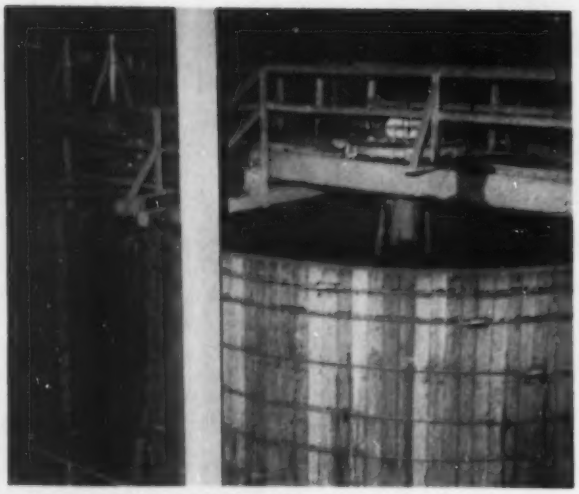
Fast 19 mph speeds enable Tournatractor to travel anywhere in the pit, dumps, stockpile area, or plant, with only a few minutes moving delay between assignments. One man, one machine, can make two or three cycles, to cover *all* clean-up assignments per shift. Often, several near-by pits are serviced by one of Material Service's Tournatractors.

Tournatractor maintains and services 10 to 12 crushed stone stockpiles located over a widely scattered area of the quarry. Equipped with 11′ 4″ wide, 3′ 7″ high bulldozer blade, Tournatractor dozes bladeful of abrasives.

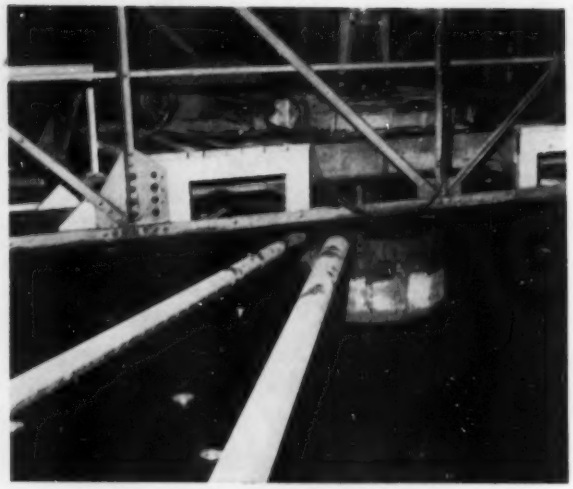


Tournatractor—Trademark Reg. U.S. Pat. Off. T-940-Q-bw

LeTourneau-WESTINGHOUSE Company
Peoria, Illinois
A Subsidiary of Westinghouse Air Brake Company

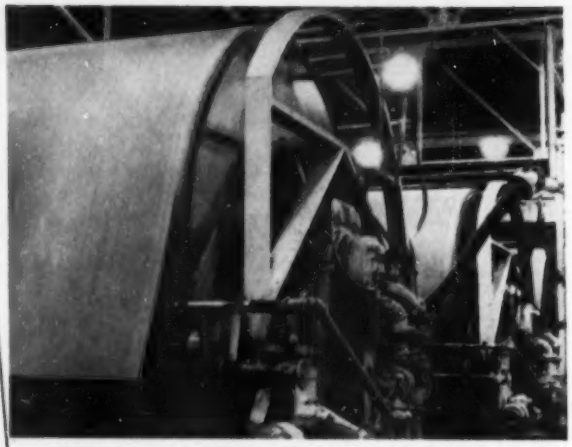


Two of the twelve Dorr Agitators installed at Gunnar.



Closeup of one of the Tray Thickeners showing drive mechanism and feeding arrangement.

URANIUM PRODUCTION AT GUNNAR MINES LTD.



Three of the six Oliver String Discharge Filters. Three additional Filters have since been ordered.

Photographs by J. Wilson, Gunnar Mines Ltd.

One of the early Uranium producers in North America, Gunnar Mines Limited at Uranium City, Saskatchewan selected Dorr-Oliver-Long equipment for above and below ground operations from our Associate Company in Canada. For the *leaching section* twelve acid resisting Dorr Agitators are installed, each 20′ dia. by 20′ deep. For the *neutral circuits* four 3-compartment Dorr Tray Thickeners are used, each 50′ dia. by 23′ deep and two 8′6″ dia. x 7 Disc American Filters. For *final residue washing*, six Oliver String Discharge Filters are employed, each 11′ 6″ x 16′ face with acid resisting construction. In the *precipitation section* is the first Rubber Lined Sweetland Filter ever built.

Now an open pit operation, Gunnar plans a new shaft in the near future and has ordered from Dorr-Oliver-Long the front dump skip, cage, head sheaves and Granby type mine cars.

For more information on the complete line of D-O equipment for the mining industry, write to Dorr-Oliver, Stamford, Connecticut.

Why the Big "B" Rear-Dump

can cut your hauling costs

Speeds to 34 mph

The new 35-ton capacity B Tournapull Rear-Dump has 10 forward speeds, from 2 mph to 34 mph . . . 2 reverse speeds, 2 and 4 mph. Rapid shift and quick acceleration of 293 hp diesel engine lets you move faster and easier into higher gear ranges.

Improved gradability

Proper distribution of weight forward onto drive wheels allows "B" to go up steep grades.

Fast loading

Large "target" area makes loading fast and simple. Bowl is 17'8" long, 10'2" wide, has maximum depth of 7'6". Rear of body provides wide, low entry which gives excavator faster loadings.

Fingertip control of dumping

The touch of a switch, activates hoist motor to lift body. As body lifts quickly, it swings behind rear wheels to dump clean. Completely streamlined bowl sheds material readily. There is positive control both up and down.

Rugged Construction

Body is heavy steel plate, rigidly reinforced. Three layer bottom consists of heavy bottom plate, thick steel billets and heat treated steel strips to resist wear. Main case of prime-mover is built extra strong . . . will not distort to put strain on power-train.

No hydraulics, springs or hinged steering connections

Problems of conventional rear-dumps are eliminated by simple design of "B" Rear-Dump. Troublesome hydraulics, long driveshafts, springs, spring hangers and hinged steering connections are eliminated. Improved hauler means higher mechanical efficiency and lower maintenance costs on all hauling jobs.

See your LeTourneau-Westinghouse Distributor about the new "B" Rear-Dump today. He can also show you how this unit can be interchanged with a Scraper or Crane, at only about 25% of original total price.

Tournapull—Trademark Reg. U.S. Pat. Off. 8R-889-G-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

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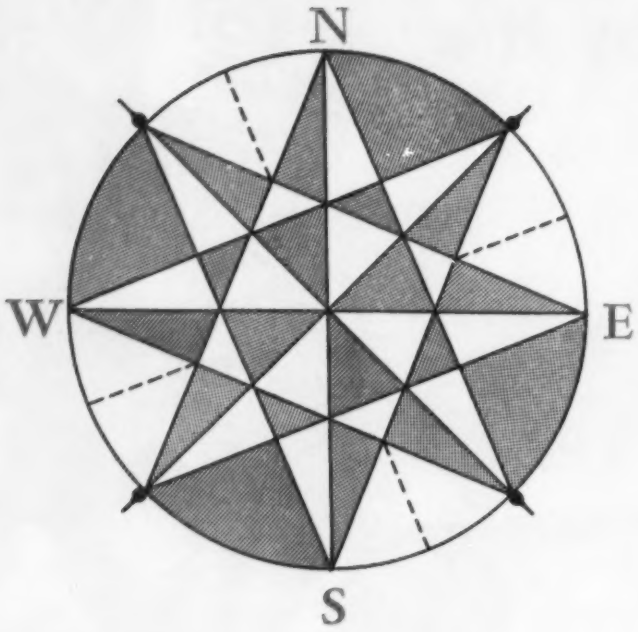
Dym & Cia. Ltda.
La Paz



ON THE GO...
ALL OVER THE WORLD

Due to progressive metallurgical technology in using modern methods of specific gravity, high tension, and magnetic separation, Carpco systems are now in use for tin, titanium, tungsten, zirconium, thorium, uranium, and many other minerals and metals.

Planning complete installations is an important part of our service. The five component Carpco companies are completely integrated — our engineers have come to us from the four corners of the earth and are capable of solving difficult and unusual problems.

From the smallest detail to completely packaged plants — it's Carpco *all over the world!*

Carpco

CARPCO RESEARCH AND ENGINEERING
CARPCO MANUFACTURING, INC.
CARPCO CONSTRUCTION CORPORATION
CARPCO EXPORT CORPORATION

JACKSONVILLE, FLORIDA, U.S.A.

Moving fast, this 550 Adams grader keeps pit floor clean, saving wear on fleets' tires and treads. Permits driving equipment by shortest routes, improves drainage.

This high-speed modern grader keeps haul-roads in first-class condition to speed movement of production haulers, reduce wear on tires and machines.

Cut mining costs thru better clean-up

There are only two ways to increase your mining profits without a rise in the price of ore. You must increase production, or lower costs. . . or both.

You may think of your grader simply as a maintenance tool. But in the hands of a good operator, a versatile, modern high-speed grader increases mining production and cuts operating costs. Check these 9 big ways increased grader capacity can increase your profits.

Occasional spill over sides of heaped trucks . . . around hoppers, grizzlies, conveyors, and trestles. . . can litter concentrating plant area, slow traffic, damage tires. This Adams grader keeps this area clean by daily clean-up.

1. ***Regular and more frequent maintenance of haul roads*** — smooth roads speed hauling, save tire-wear, cut mechanical maintenance, improve safety.

2. ***Quick clean-up after blast***—grader provides a fast, inexpensive way to move scattered fragments back against toe, thus protecting men, machinery, and tires working around pit, speeding up all pit operations.

3. ***Clean pit floors*** — regular routine of maintaining wide traffic ways that make all areas of pit quickly accessible pays off. Equipment can travel to any assignment by shortest route. Smooth access saves wear on tires and crawlers, improves drainage, prevent dirt and refuse from weathering into levels of ore below floor.

4. ***Maintain good housekeeping around plant***—you need ample grader capacity to keep roads, runways, working areas around plant neat, clean, and workable at all times. Level or remove the occasional spill left by heaped trucks. . . from around hoppers, grizzlies, conveyors, trestles. Clean plant area speeds all mobile equipment operation around plant, reduces dust, improves safety.

5. ***Keep stockpile toes pushed in*** — weather and loading operations result in spread of toes around stockpile. This limits working space, wastes stored material. Also, working thinly-spread toes means inferior ore grades, increases loading cost. Regular grader service helps prevent this waste.

6. ***Keep dumps smoothly spread and level*** — regular grader service can spread dumped material clear over edge. Offset blade reaches far beyond leaning front wheels which hold against side thrust. A smooth, level, dry dump speeds hauling and dumping, cuts equipment costs. Grader can smooth haul road coming and going.

7. ***Clean ore benches of washed-down dirt*** — every rain washes dirt into upper benches, lowers ore grade. Prompt grader service halts "wash", provides planned drainage, piles washed-in material for easy removal by scraper or truck.

8. ***Assist exploration teams*** — a modern grader can build a well-graded and drained roadway in a matter of hours, speeds exploration work by maintaining good haul roads.

9. ***Keeps drainage open*** — in a few hours work per week, a modern grader will keep ditches clean, pit dry.

Inventory capacity of your present graders

It will pay you to inventory the work capacity of your present graders. If they are more than a few years old, you will probably find a substantial saving in replacement with the faster, more powerful, big capacity graders currently on the market. We will be glad to assist by furnishing specifications and comparative statistics on our line of modern Adams graders.

Reprints available on request.

AG-34-M-b

LeTourneau-WESTINGHOUSE Company

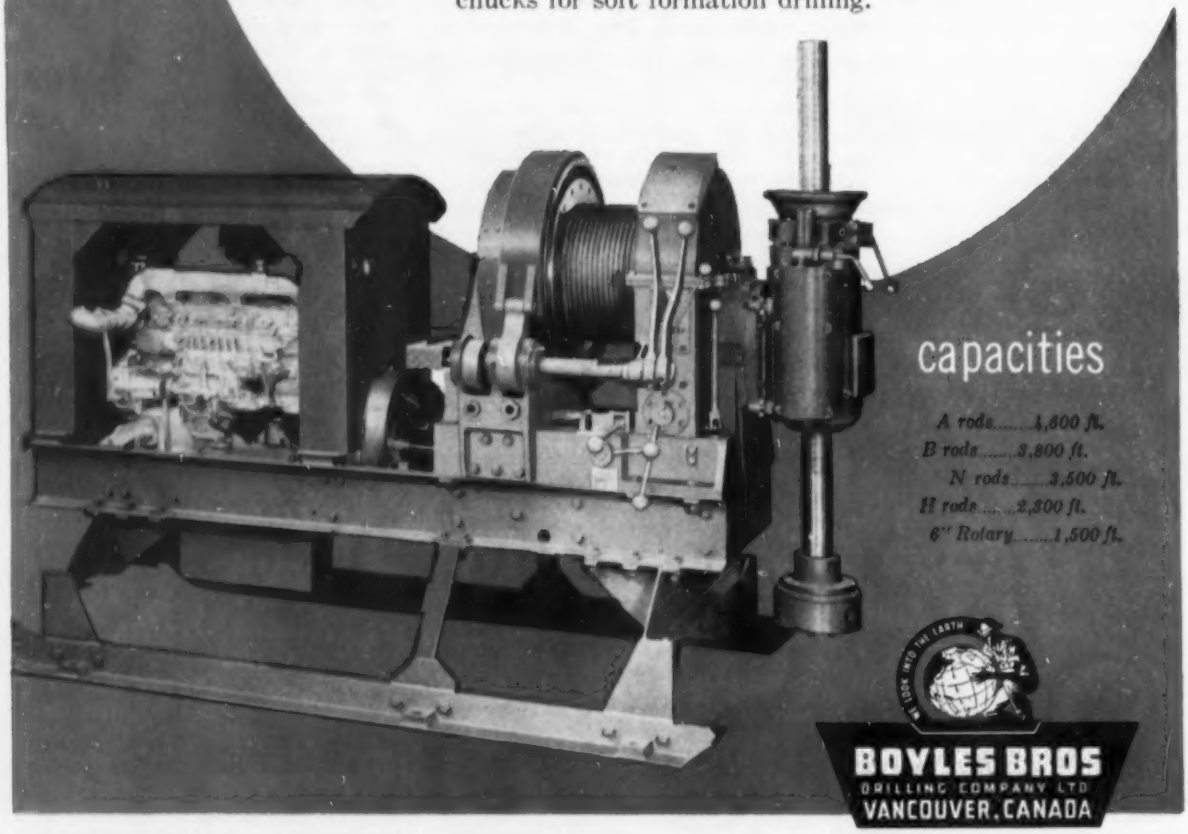
Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

now...the BBS-3 for deeper diamond drilling

Here is the newly developed BBS-3 surface Diamond Drill. Like the well-known BBS-2SR and BBS-4 models the new BBS-3 is designed for speed, strength and ease of operation even under the most severe conditions.

Powered by a Perkins 95 h.p. R6 diesel or an optional 95 h.p. Hercules DJXH diesel, the BBS-3 has a neutral plus four forward and four reverse gears for either the hoist or the swivelhead. Other features include a strong high-speed hoist with speeds to 850′ per minute, choice of gear or hydraulic swivelheads, fast self-centering hydraulic chucks for soft formation drilling.



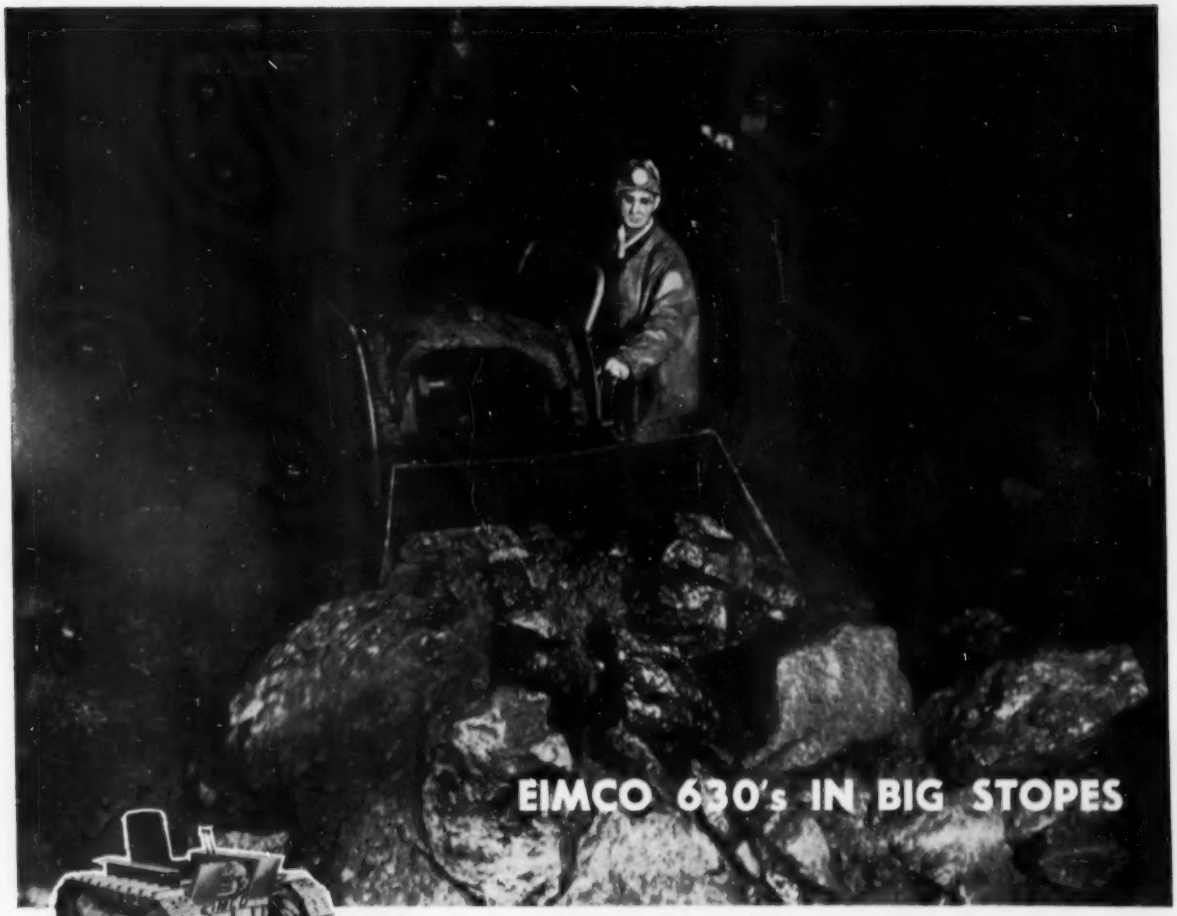
capacities

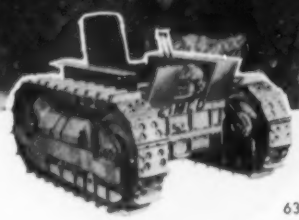
A rods.....4,600 ft.
B rods.....3,800 ft.
N rods.....3,500 ft.
H rods.....2,800 ft.
6" Rotary.....1,500 ft.

WE LOOK INTO THE EARTH

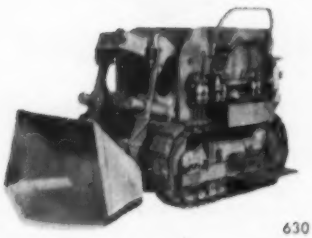
BOYLES BROS
DRILLING COMPANY LTD
VANCOUVER, CANADA

BOYLES BROS. (PTY) LTD., JOHANNESBURG, SOUTH AFRICA • BOYLES BROS. DRILLING CO. LTD., NEWCASTLE-ON-TYNE, ENGLAND • ATLANTIC, GULF AND PACIFIC CO. OF MANILA, PHILIPPINES • SHRIRO TRADING CO. S.A. TOKYO, JAPAN • FORMAC S.A. RIO DE JANEIRO, BRAZIL • WEISE AND CA. LDA., LISBON, PORTUGAL • I. H. HANNA, 331 SANTA CRUZ, SAN ISIDRO, LIMA, PERU • R. I. E. G. A. BUENOS AIRES, ARGENTINA • HAEHRE AND CO. A/S. OSLO, NORWAY • INTERNATIONAL MACHINERY CO., SANTIAGO, CHILE DIMITRY SCALISTIRI, ATHENS, GREECE • THOMAS M. NEVIN, Y. CIA. S.A. MEXICO, D.F.

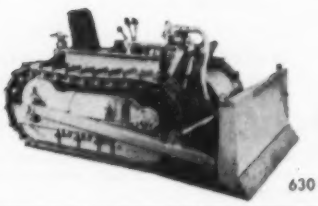




630 Tractor



630 Excavator



630 Bulldozer

Open stope mining has been the proving ground for numerous types of mechanical loading equipment. One type has replaced another as each succeeding piece of equipment has been able to show greater versatility, greater dependability and lower costs.

Mining men in these fields have been quick to try out any equipment, accept it, remodel it or reject it.

Their reaction to the Eimco 630 Excavator has been enthusiastic. "We're re-ordering on the 630, it's giving us the lowest per ton cost and the highest production."

Eimco 630 Excavators have proven their dependability in mines and on contract jobs. Their heavy-duty construction has made them the lowest cost loaders used underground. They are easily controlled, fast in action and their loading speed averages three tons per minute in rock.

Independent track control on the Eimco 630 provides unusual flexibility for the operator. New features built into the 630 provide the ultimate in operator safety, operator convenience and ease in machine care.

The 630 is a rugged, hard working machine with a tough, carefully designed and precision made operating mechanism.

Lower your loading costs with Eimco equipment. Thousands of Eimcos are working every day wherever mining is done. You can depend on an Eimco.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Baltimore, Md. Pittsburgh, Pa. Seattle, Wash. Pasadena, Calif. Houston, Texas Vancouver, B. C. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

EIMCO

B-198

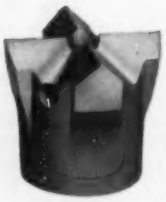
Put the bite on your drilling costs

TIMKEN® interchangeable bits let you switch bit types without switching drill steels

DOZENS of different Timken® rock bits—both multi-use and carbide insert—fit the same drill steel. They can be changed fast, right on the job. Just screw one type off, screw another right on the same steel. No need to switch drill steels at the same time. Your drillers can quickly switch to the most effective and economical bit as the ground changes. And you can cut expensive drill steel inventories.

Timken rock bits are made from electric furnace Timken fine alloy steel. And Timken bits have a shoulder union specially developed by the Timken Company that prevents drilling impact from damaging threads.

If you have a drilling problem, let our rock bit engineers tackle it. Use their more than twenty years of experience to your advantage. They'll welcome the opportunity to help you put the bite on your drilling costs. Just write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



WHERE YOU CUT COSTS WITH TIMKEN MULTI-USE BITS

Most economical for ordinary ground. With correct and controlled reconditioning, they give the lowest cost per foot of hole when full increments of steel can be drilled.

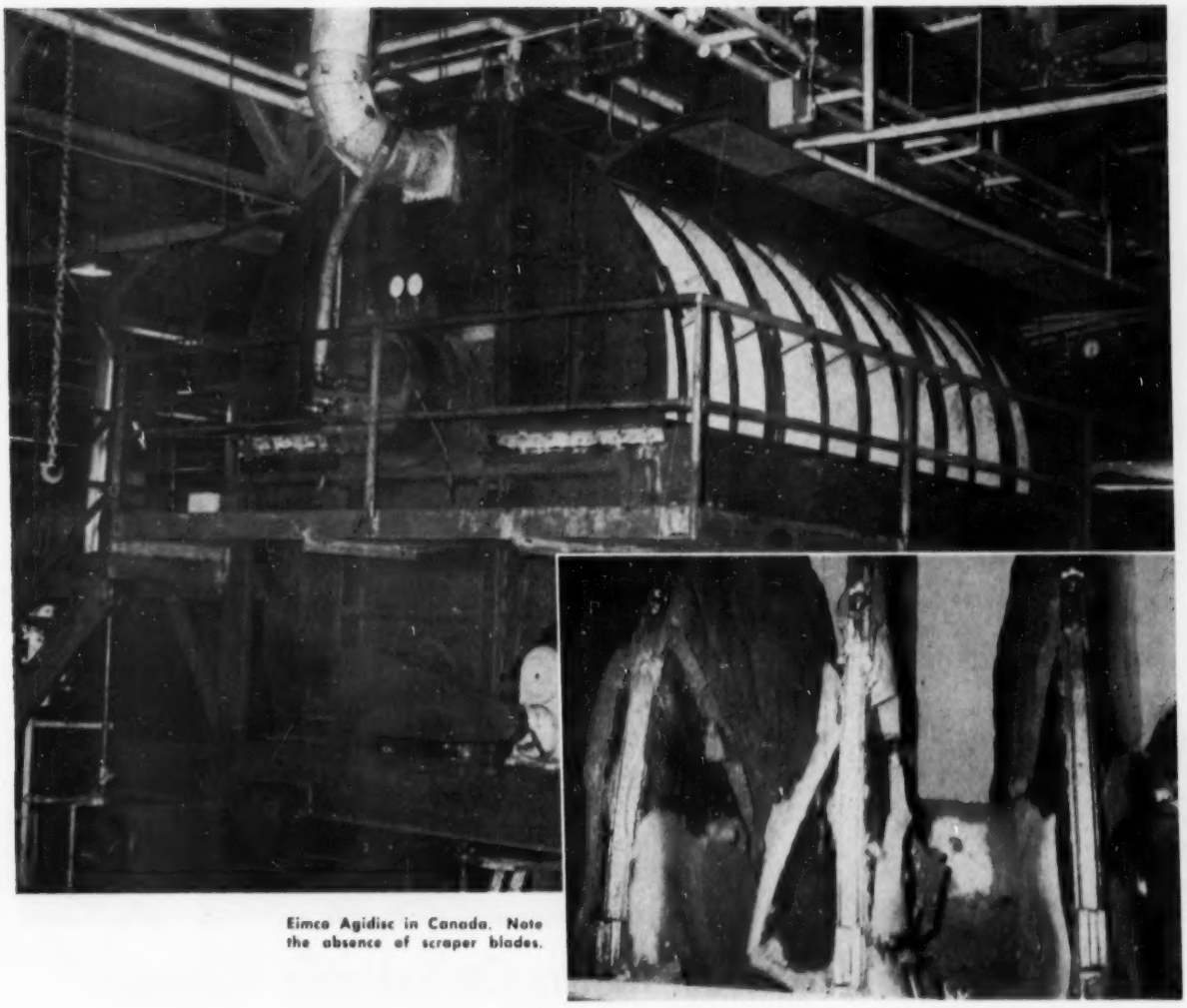
WHERE YOU CUT COSTS WITH TIMKEN CARBIDE INSERT BITS

Give highest speed through hard, abrasive ground. Also most economical for constant-gauge holes, small diameter holes, very deep holes.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

...your best bet for the best bit...for every job



Eimco Agidisc in Canada. Note the absence of scraper blades.

HIGHER TONNAGES WITH EIMCO AGIDISC FILTERS

Eimco Agidisc filters work continuously and produce higher tonnages because Agidiscs keep the slurry agitated to optimum density throughout the tank.

The Eimco Agidisc produces a cake that is uniform in thickness over its entire surface, a cake with uniform dryness and has an even distribution of particle size. These characteristics have made it possible for one metallurgical plant to reduce the number of filters contemplated by one half. In another plant on a concentrate, the work done previously by seven filters is now done by four Agidiscs, and in another, one fourth the space occupied by four drum filters (unable to handle the flow) is now occupied by two Eimco Agidiscs which handle the entire flow working about two-thirds capacity.

In addition to the tonnage, dryness and space advantages, Eimco Agidiscs can be equipped with snap blow for most applications. Note snap blow connection in valve of filter shown above and effect on cake (inset). The addition of this cake discharge attachment breaks the cake free of the filter media, prevents blinding in most cases, eliminates scrapers and increases the life of the media.

Eimco engineers will welcome an opportunity to demonstrate the increased savings in your plant through the use of Agidisc filters. Write for complete information.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Baltimore, Md. Pittsburgh, Pa. Seattle, Wash. Pasadena, Calif. Houston, Texas Vancouver, B. C. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

B-104

Uranium miner, James T. Gray looks over his Le Roi Model 210 Airmaster compresser, which cost him only 40¢ for repairs last year.

View of James T. Gray's uranium mine located far back on Colorado Plateau. Le Roi Model 210 Airmaster compressor, shown in background, provides air power for operation.

How 55% of Uranium Miners On Colorado Plateau Cut Air-Power Costs

One miner spent only 40¢ on compressor repairs in year.

Use of LPG fuel means additional savings in time and money.

Latest reports show that 55% of the compressors sold on the Colorado Plateau are Le Roi — the dependable air compressor. Le Roi-Cleveland air legs and rock drills were also selected to help keep costs down on most of these uranium projects.

Take the case of miner James T. Gray, for instance. Even though he's a long way back in the mountains, far from repair parts, downtime and distance don't worry him. One reason is that last year he spent only 40 cents for repairs on his major source of power—a Le Roi Model 210 Airmaster Compressor.

Six cents a gallon fuel savings provide another cost-cutting factor at Jim Gray's uranium mine. This large saving is possible because he runs the Le Roi compressor on liquid propane gas. In a year, the six-cents-per-gallon saving grows into a respectable total.

Dependable fuel supply and bulk purchases give miner Gray further dollar savings. To eliminate dangers of being cut off from fuel supply, he installed an LPG storage tank and hooked it directly to the air compressor. Once a month he fills the storage tank with LPG fuel. From this supply, he gets a steady, reliable flow of fuel for at least 30 days — an important advantage on mining projects far back on the craggy, Colorado Plateau. It's time saving, too, because it eliminates the need for daily refueling of the compressor tank.

Both the engine and compressor in the Model 210 Airmaster are manufactured by Le Roi. This assures you complete dependability and more economy. Le Roi Airmaster Compressors also have removable, copper-finned, individual radiator and intercooler core sections, for efficient cooling under all operating conditions. 100% interchangeable valves are readily accessible for quick, easy maintenance.

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

Tough Digging in Confined Areas

Eimco 105 Tractor Excavators can work efficiently in small areas because of their built in features.

These features permit the Eimco 105 to work in many places such as narrow ditch digging, tunnels, water channels, mines, railroad cuts, highway widening jobs and numerous others including basement excavation as shown above.

The Eimco 105 features include: (1) Independent track control so that one track can be run forward while the other runs reverse providing spin turns in the length of the machine, (2) Up front position of the operator for better visibility in confined areas, (3) Overhead bucket motion, to eliminate the necessity of turning to discharge the bucket, (4) Simple easy controls, two small handles are all that control the motion of the tractor. Push for forward motion and pull for reverse motion.

Eimco 105 Tractor-Excavators are being used on construction jobs all over the world as well as in mines and quarries. These machines are operating longer periods at lower cost per yard loaded than any other equipment.

Investigate the Eimco Tractor-Excavator — it is the world's finest crawler tractor equipment.

THE EIMCO CORPORATION

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EIMCO

B-195

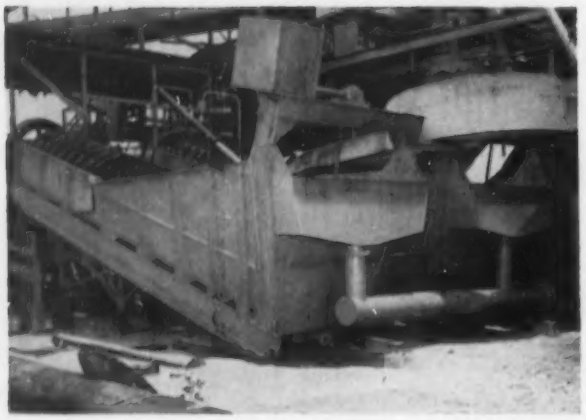
AKINS...first in EXPERIENCE

used since 1908 for efficient, low-cost classification

TYPICAL CASE HISTORY:

Pioneering in Phosphate

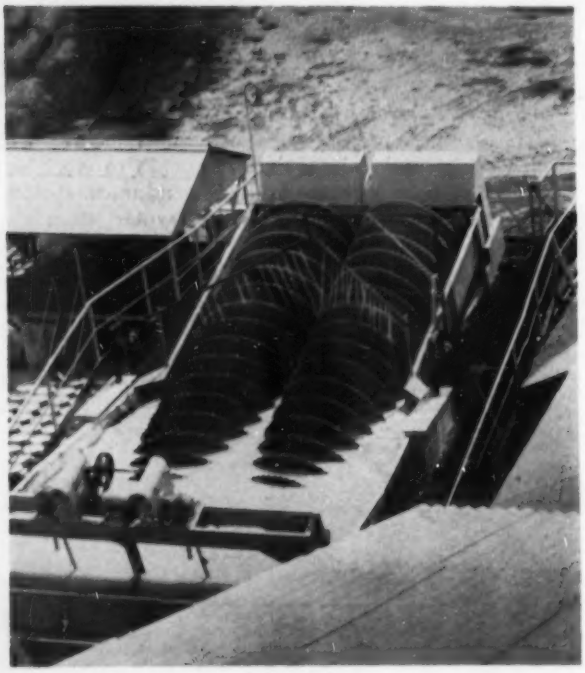
In cooperation with the phosphate mining companies, Colorado Iron Works engineers applied their specialized classification experience in helping to solve the problems associated with developing efficient treatment of phosphate ores. Akins dewatering, deoiling and desliming classifiers were among the first used in this field. Having proved their efficiency Akins Classifiers predominate the phosphate field.



1944

...2 Akins for Swift and Company's Watson Mine, one of first classifier installations on phosphate.

These 2—54" Akins Simplex Classifiers, installed in 1944, and 2 others purchased later, are dewatering and desliming + 150, — 35 mesh flotation feed.



1956

...8 Akins at Armour Fertilizer Works' New Plant, Bartow, Florida.

This recent installation includes 1—78" Duplex Akins, 1—66" Duplex Akins, 1—60" Duplex Akins, 1—66" Simplex Akins, and 4—60" Simplex Akins. They are being used for dewatering flotation feed, flotation concentrate, belt feed, belt concentrate, and for primary and secondary deoiling.

There are now 28 Akins operating successfully in 8 phosphate plants.

AKINS . . . the Original Spiral Classifier*

*A Registered Trademark of C.I.W.

COLORADO IRON WORKS CO.

A SUBSIDIARY OF THE MINE AND SMELTER SUPPLY CO.

DENVER, COLORADO

SPECIALISTS IN CLASSIFICATION FOR 48 YEARS

WHAT IS A WICKWIRE ROPE DISTRIBUTOR?

- He's quality people... handling quality products.
- He knows the local industries he serves, and he knows wire rope.
- He solves your wire rope problems. His own first-hand knowledge and experience are backed up by the technical assistance of Wickwire Sales Engineers.
- He brings you Wickwire Rope and Slings at the lowest possible cost, because he spreads his sales and distribution expense over the hundreds of related items he carries.
- He stocks exactly what you need, saving you time, paper work and storage space.
- He's a good man to know. Buy your Wickwire Rope and Slings from him. You'll find that the many valuable services he offers far outweigh any apparent price advantage you might gain by buying direct.

CF&I WICKWIRE ROPE A CF&I PRODUCT

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

3147

Prospecting. The 'Jeep' Truck is a workhorse for towing equipment over rough areas. With the extra traction of its 4-wheel drive, it reaches off-road areas where there's work to be done. Its partner, the Universal 'Jeep' is equally adaptable for prospecting needs.

How the 4-Wheel-Drive 'Jeep' family does more jobs better...faster!

Mobile Power. This 4-Wheel-Drive Universal 'Jeep' takes a mobile welder to out-of-the-way locations. With power take-off, the 'Jeep' also operates compressors, generators, drills and winches.

Transportation. The 4-Wheel-Drive 'Jeep' Truck transports men, tools and equipment between mines or wherever they're needed. Keeps maintenance service and supplies moving smoothly.

'Jeep' 4-Wheel-Drive vehicles are proving their value and versatility every day in every phase of the mining industry. From exploring or prospecting in remote areas to keeping maintenance work and service moving smoothly, they demonstrate their versatility. With the extra traction of their 4-wheel drive, they haul ore trailers in trackless mining — up steep inclines, or over rocky ledges. And for travel on good roads they shift easily into 2-wheel drive. Versatile 4-Wheel-Drive 'Jeep' vehicles pay for themselves in a short time because of their adaptability to many jobs, economical performance, long life and low maintenance costs. See your 'Jeep' dealer or write for information.

The 'Jeep'®

family of 4-Wheel-Drive vehicles

WILLYS...makers of the world's most useful vehicles

WILLYS MOTORS, INC., TOLEDO 1, OHIO

Gets more... Keeps more... Delivers more

more **PRODUCTIVE** capacity

New model **HO**
2¼ cu. yd. CAPACITY
7,500 lbs. @ 4 mph

It's the yardage a tractor-shovel delivers per hour or per shift that counts, and that is why the big new model HO "PAYLOADER" is outstanding. Its famed bucket action with Pry-out and 40° tip-back *gets more* load. It *keeps more* load (less spillage) while carrying because of the exclusive bucket cushioning . . . . it *delivers more load.*

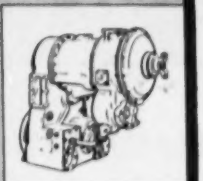
The model HO is the biggest and finest "PAYLOADER" ever offered in all Hough's history of tractor-shovel pioneering and leadership. It delivers better, more reliable traction than any wheeled tractor shovel ever has . . . . is more maneuverable, faster, easier operating and easier riding — with or without a load. It has power shift (no clutching), 4-wheel power brakes and power steer plus proven design that assures long life and low maintenance.

If you want big yardage day after day, without interruption, you want this big model HO. Your "PAYLOADER" Distributor is ready to give you full information.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Complete Power-Shift Transmission

The fastest and easiest-operating transmission ever built. All shifts can be made instantly, on-the-go, under full engine speed. There's no stopping for a RANGE shift, there's no foot clutch. With the forward-reverse control the operator can "creep" the machine at full engine speed, in any gear, while maintaining full bucket action . . . all this plus torque converter drive.



Planetary Final Drives

Rugged planetary final drives in the wheel hubs, plus hypoid differential gearing, keep torque low in axles . . . prolong life of axles and all drive train parts. Torque-proportioning differentials assure effective traction under slipping conditions. If one wheel starts to slip more power is delivered to the opposite wheel.

THE FRANK G. HOUGH CO.
859 Sunnyside Ave., Libertyville, Ill.

Send full information on "PAYLOADER" 4-wheel-drive tractor-shovels.

☐ model HO—2¼ cu. yd. ☐ model HH—1½ cu. yd.
☐ model HU—1 cu. yd.

NAME _____
TITLE _____
COMPANY _____
STREET _____
CITY _____
STATE _____

In N a...And the World Over

Bucyrus-Eries get down to paydirt FAST

IN open-pit mines everywhere, Bucyrus-Erie shovels like this 6-yd. 150-B are demonstrating their ability to strip overburden and load ore fast and economically.

You can see *how* they do this as you watch them work — heaped dippers, smooth cycles, ease of control that cuts operator fatigue, plus year-after-year dependability.

You can see *why* Bucyrus-Eries are superior performers when you check their design and construction. The strong yet light front end reduces deadweight, saves power. Ward Leonard electric control provides immediate response, permits time-saving coordination.

We would be glad to tell you more about Bucyrus-Erie excavators — how they can improve *your* operations.

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE, WISCONSIN

97L56C

DAVISON CHEMICAL CORPORATION

dries petroleum catalyst with a STANDARD HERSEY ROTARY DRYER

Intermediate Feed System makes Combination Dryer

The patented STANDARD-HERSEY intermediate-feed system makes the dryer used by Davison Chemical Corporation a combination flash and rotary dryer. This combination retains the most desirable characteristics of each.

Here is another example of the engineering skill developed by the 52 year old Standard Steel Corporation. Thousands of successful dryer applications such as this give STANDARD-HERSEY an unsurpassed background to draw on in solving your drying problems. More than 30 different dryer types are available to fit any drying requirement. Contact STANDARD-HERSEY for the most profitable, most productive solution to your drying needs.

DF-4

SEND FOR FREE 12-PAGE ILLUSTRATED BULLETIN

Learn how STANDARD-HERSEY has aided manufacturers throughout the world in solving their dryer problems.

COMPLETE PILOT PLANT TAKES GUESSWORK OUT OF DRYING

STANDARD-HERSEY'S pilot dryers play an important part in solving your drying problems *before* blueprint stage.

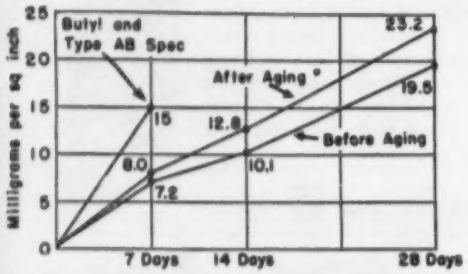
THE STANDARD FOR 52 YEARS

STANDARD STEEL CORPORATION

5031 Boyle Avenue, Los Angeles 58, California; 15 Park Row, New York 31, New York

Up out of harm's way, Anaconda 250MCM, 13,000-volt, grounded neutral, butyl-insulated, shielded, neoprene-jacketed cable delivers more power at lower cost to mine face in Colorado operation.

Go up to bring costs down—with Anaconda Mine Power Cable



Exceptional moisture resistance is provided by Anaconda Type AB butyl insulation, tests show. Type AB absorbs less than half as much moisture after 7 days as specifications permit.

With the trend to higher voltages in the mine—many companies are finding they can bring costs down by using overhead Anaconda butyl-insulated cable.

Cable is out of the way of damage by equipment, is easier to move, better for re-use. And there's no ditch to dig or fill, leaving a solid floor.

Even where moisture is a problem, you can outwit this enemy of long cable life with Anaconda butyl-insulated cable.

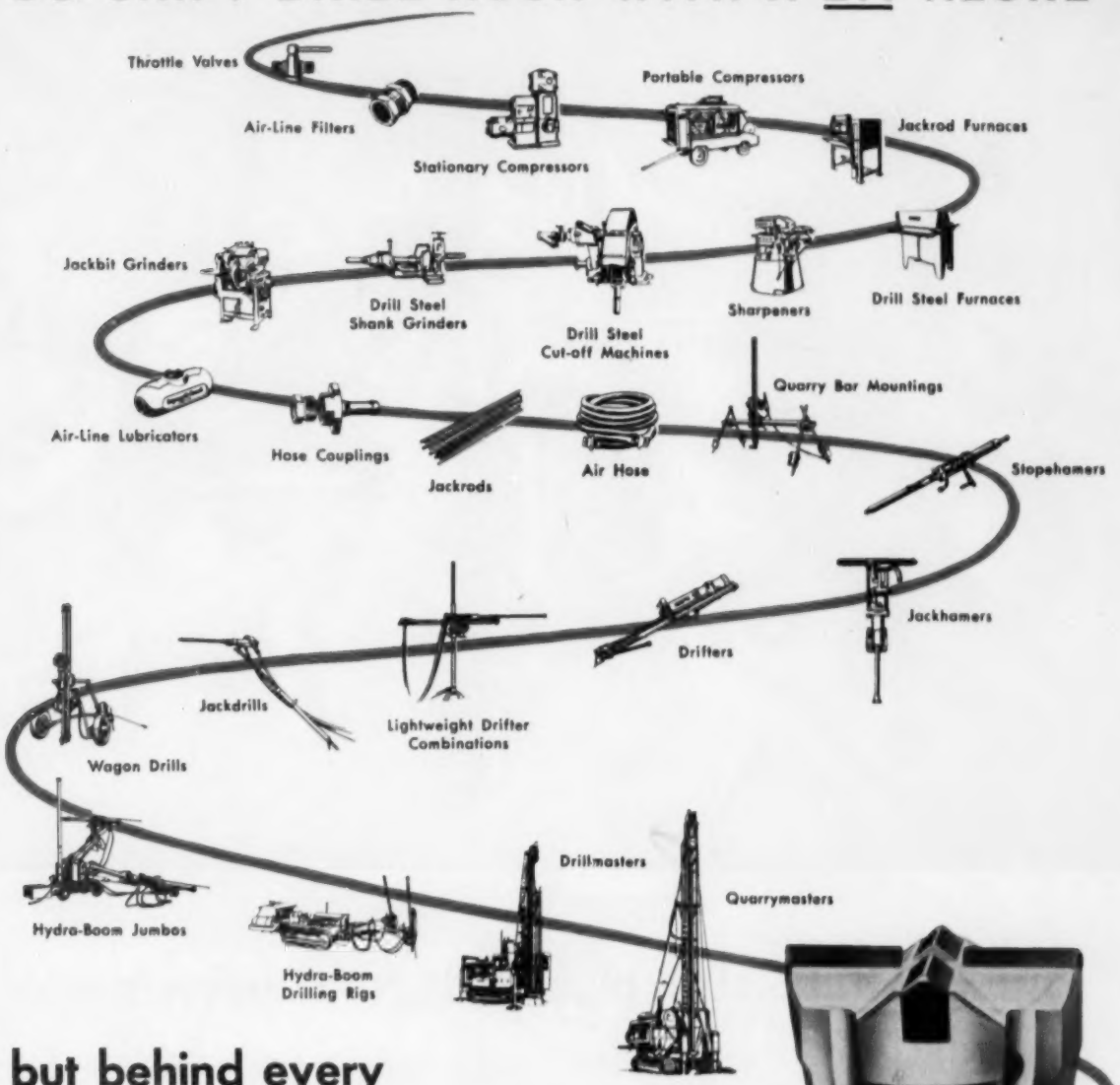
Latest tests show Anaconda's Type AB butyl high-voltage insulation absorbs far less moisture than industry standards permit . . . is many times better than competitive materials. And—Type AB's higher tensile strength gives you a stronger, sturdier cable.

New Engineering Bulletin EB-27 has full details on performance of Type AB insulation in 15 Industry Specifications tests. Ask the Man from Anaconda for your copy as well as information about Anaconda Aerial Cable. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 56330

SEE YOUR ANACONDA®

DISTRIBUTOR FOR MINE POWER CABLE

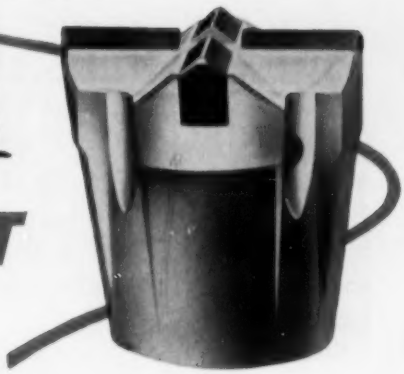
YOU CAN'T DRILL ROCK WITH A BIT ALONE



but behind every

CARSET JACKBIT

there's a complete line of rock drilling equipment



WHATEVER you need for drilling rock, this complete line is a big plus in your favor. It means one source with undivided responsibility. It means a co-ordinated line of equipment that's designed and built to work together. And it means complete *service*, too — backed by over 80 years of experience and leadership in this specialized field.

You'll find that it *pays* to make Ingersoll-Rand your headquarters for everything in rock drilling.

15-233

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

ROCK DRILLS • COMPRESSORS • AIR TOOLS • TURBO BLOWERS
CONDENSERS • PUMPS • OIL & GAS ENGINES

TIREX CABLES strip high costs from maintenance

Wherever there's mining, you'll find Simplex-TIREX cords and cables used on the toughest jobs.

You'll see them supplying power for light—transmitting track signals—feeding drills, loaders, coal cutters, shuttle cars, feeders and electric locomotives.

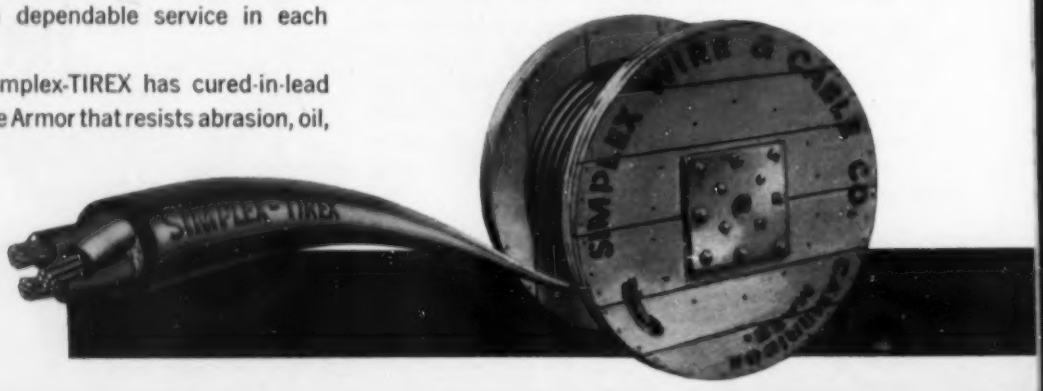
Such universal use is based on several facts:

First, Simplex Wire & Cable Company makes famous TIREX in a wide range of sizes, each designed to provide dependable service in each application.

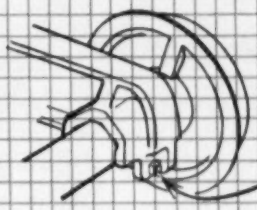
Second, only Simplex-TIREX has cured-in-lead Selenium Neoprene Armor that resists abrasion, oil, flame and water. Yet it is smooth, snagproof, flexible.

Third, Simplex-TIREX bears the "P-101-BM" markings—performs dependably and safely over longer periods.

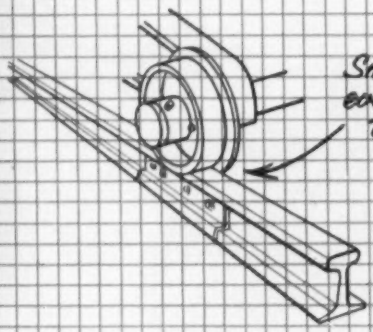
Simplex-TIREX Cords and Cables are available at most mining supply houses and electrical distributors. Be sure to specify "Simplex-TIREX"—it's the only "TIREX". **SIMPLEX WIRE & CABLE CO.,** 79 Sidney Street, Cambridge 39, Massachusetts.



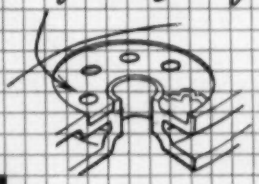
Movement between bolster and side frame is taken on specially designed wear surfaces



Quick wheel change

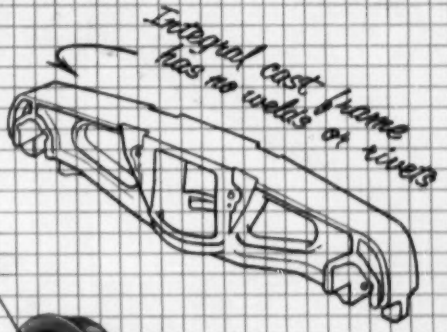


Smoother ride even on rough tracks



Large center bearing for longer life

V-shaped machined axle grips for controlled flexibility and truck alignment



Integral cast frame has no welds or rivets

Check these "plus" features

OF NATIONAL TRUCKS

If you're considering the purchase of new 8-wheel mine cars . . . or if you're thinking of modernizing older cars—*now* is the time to check the advantages of National NC-1 Trucks. National NC-1 Trucks have controlled flexibility for track variations yet still maintain truck alignment through their machined V-shaped axle grips. In addition, NC-1 Trucks have a built-in shock absorbing mechanism.

You get more out of your mine car investment per workshift . . . per day . . . per year. And at the same time you minimize spillage . . . get greater protection for your equipment, track and structures . . . slash maintenance to a new low.

Yes, *now* is the time to check National NC-1 Trucks—they make sense for 8-wheel mine cars . . . *make dollars for operators*, too.

AA-2901

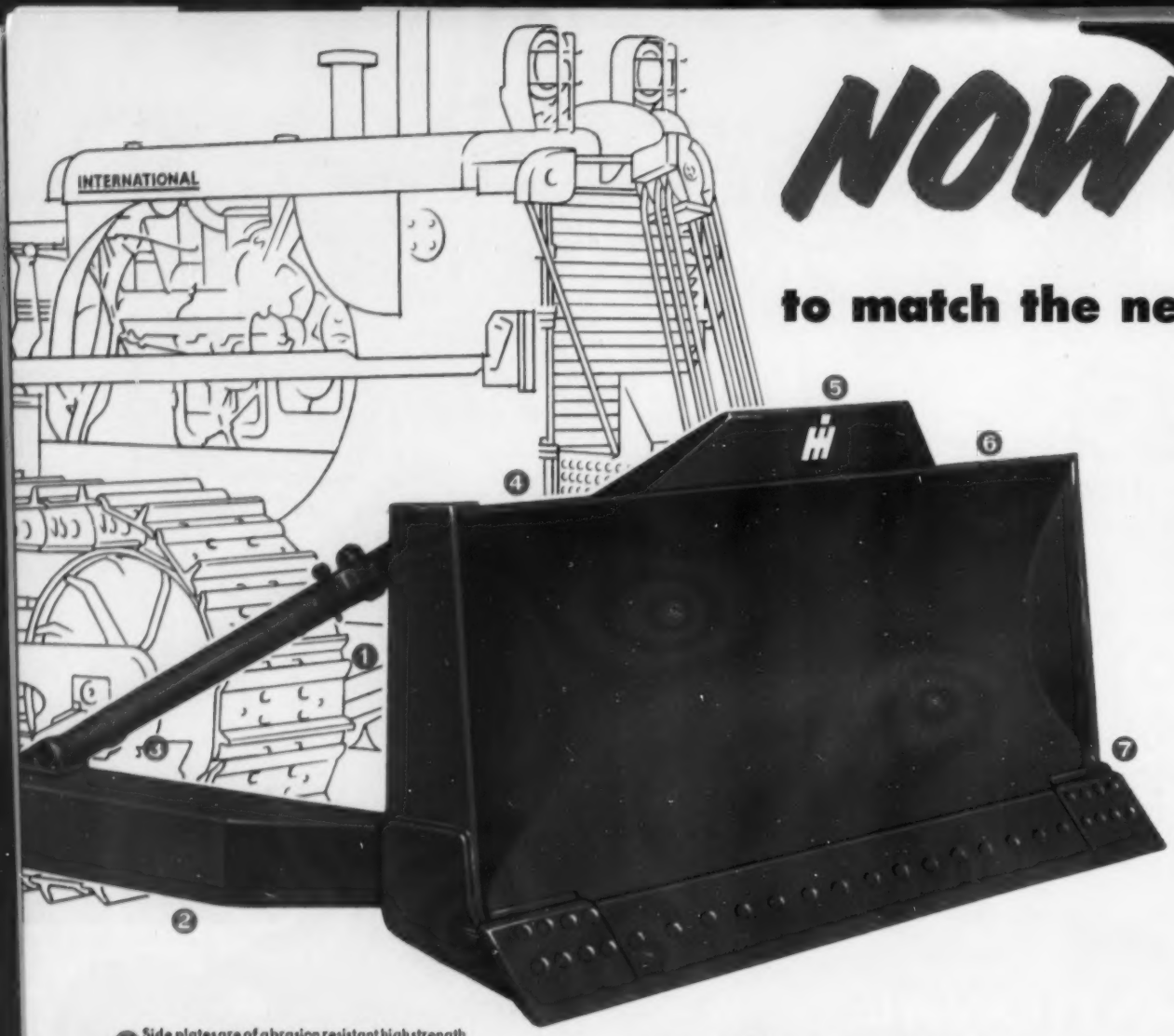
WILLISON AUTOMATIC COUPLERS
RUBBER CUSHIONED UNITS
NC-1 CAR TRUCKS • NACO STEEL WHEELS
NACO STEEL LINKS & SWIVEL HITCHINGS

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

NOW.

to match the new



1. Side plates are of abrasion resistant high strength steel, securely fused to moldboard and box sections by low-hydrogen welding. They prevent load spillage, allow you to carry larger loads. Standard on all International bulldozer blades.

2. Push arms are sturdily constructed of box sections. Side plates are mill-rolled with integral back-up bars to support top and bottom plates. Machine welding guarantees uniformity of weld.

3. Headless pins, locked by eye bolts, secure struts to blade. For removal, pins can be driven out in either direction. On hydraulic blades, all control linkage is connected to the blade through self-aligning bearings.

4. Entire perimeter of blade is backed by heavy box channels solidly fused to moldboard. With this type of construction moldboard, box channels, and welds flex freely to prevent weld failure.

5. Spillboard is wide and high to prevent spillage over top of blade. Note that it is curved to match the contour of the moldboard, thus aiding boiling action. Width of moldboard allows you to carry full load for which the blade was intended.

6. Moldboard is formed from a single sheet of low-alloy, high-strength steel. International blade is shaped to perfect curvature in a special forming machine to assure uniform strength and stress resistance over entire area.

7. Shear bars welded to moldboard support end bits and relieve stress on end bit bolts. Lower edge of end plate is reinforced by wear plate to add strength at corners, increase wear resistance.

New blades designed from "ground" up

To make full use of the greater work capacity of the new Bonus-Powered International crawler tractors, we now offer a complete line of newly designed blades matched to tractor power.

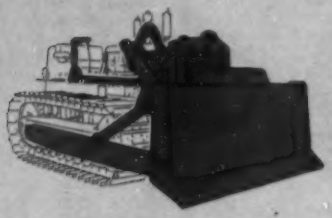
These new blades are rigidly supported around the edges by box sections to give the blade strength but also permit the moldboard to "breathe" under load stresses. New automatic welding processes guarantee that the welds in International blades will hold up under *any kind of job conditions.*

International blades will last far longer and give you far less trouble than any others you have ever hung on any tractor. When you inquire about the new line of Bonus-Powered International crawler tractors, ask your International Industrial Power Distributor for all the facts about the new line of matching blades. See for yourself that they are the best designed, best constructed on the market.

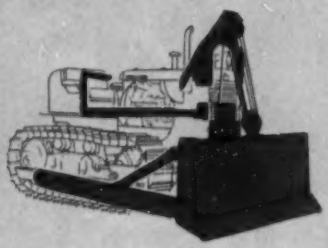
Write For New Blade Literature: An illustrated specification list of the *228* attachments available for International crawler tractors is just off the presses. For your free copy of Mailing Folder CR-492-F, write Consumer Relations Department, International Harvester Company, 180 North Michigan Avenue, Chicago 1, Illinois. No obligation, of course.

..42 new blades

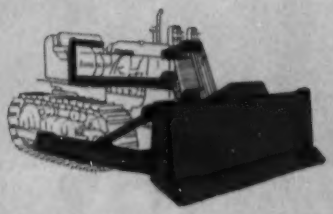
..Bonus-Powered International crawlers



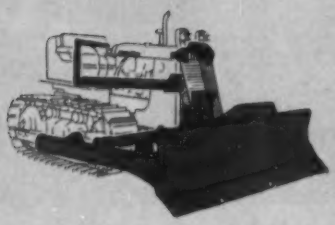
Direct Lift Hydraulic Bulldozer
Operates off front-mounted, gear-driven pump which gives fast blade action. Self-aligning bearings prevent binding of linkage.



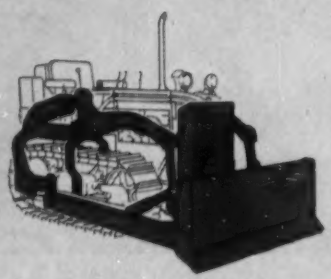
High-Gantry Cable Bulldozer
Operates off either front or rear-mounted International cable control unit. Available for TD-24, TD-18, and TD-14 tractors.



Low-Gantry Cable Bulldozer
Operates off either front or rear-mounted International cable control units. Available for TD-24, TD-18, and TD-14 tractors.



Hydraulic or Cable Bullgrader
Operates off high or low gantry, front or rear cable controls on TD-24, TD-18, and TD-14 tractors. Hydraulic bullgrader also for TD-9, TD-6, and T-6 tractors.



Track Frame Mounted Bulldozer—Distributes the load evenly over the length of the tracks. Available only for TD-9, TD-6, and T-6 tractors. Bullgrader also available.

International Drott "4-in-1"
Newest of International Drott loaders. Combines Skid-Shovel, Bull-clam, clamshell, and bulldozer in one unit. Available for TD-14, TD-9, and TD-6 tractors.

INTERNATIONAL HARVESTER

International Industrial Power

180 N. MICHIGAN AVENUE—CHICAGO 80, ILLINOIS

A COMPLETE POWER PACKAGE INCLUDING Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Tractor and Rubber-Tired Loaders . . . Diesel and Carbureted Engines

For Top Tonnage at

Rock-Bottom Cost

Cast steel frame, upper shell and spider in one piece.

Traylor-original, self-tightening bell heads and curved concaves of manganese steel.

Traylor patented dust seal, excludes dust and grit from the lubricating chamber.

Closed circuit automatic force-feed lubricating system, with filter and oil cooler.

Machine-cut steel gearing.

Self-contained countershaft bearing, fitted with roller bearings and automatically lubricated.

Bronze lined eccentric bearings.

When it's a problem of combining peak ore production with closely controlled costs, you'll find the solution in a Traylor Reduction Crusher . . . as have almost a thousand operators on all types of crushing installations throughout the world. Traylor Reduction Crushers are extremely rugged, compact machines which have long been famous for their simplified design. They require a minimum of floor space and head room.

"Traylor-made" to individual specifications, each crusher incorporates all the famous features developed by Traylor in over a half century of engineering experience. Traylor offers a complete line of secondary crushers. 6 sizes provide feed openings from 1½" to 22", product sizes from ¼" to 3½".

Here are the features that combine peak production, economy of operation and reduced maintenance costs in Traylor Reduction Crushers.

TRAYLOR ENGINEERING & MFG. CO.
817 MILL ST., ALLENTOWN, PA.
SALES OFFICES: New York • Chicago • San Francisco
CANADIAN MFR: Canadian Vickers, Ltd., Montreal, P. Q.

Traylor

THE COMPLETE LINE OF

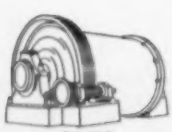
REDUCTION CRUSHERS

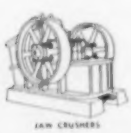
Send for Traylor Literature containing full specifications, description and illustrations of the Traylor Reduction Crusher you need. Outline your requirements briefly.

PRIMARY GYRATORY CRUSHERS

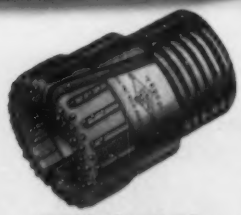
ROTARY KILNS

SECONDARY GYRATORY CRUSHERS

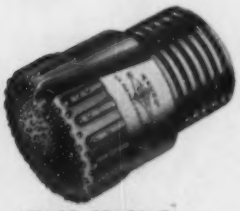

BALL MILLS


JAW CRUSHERS

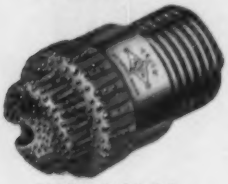
APRON FEEDERS



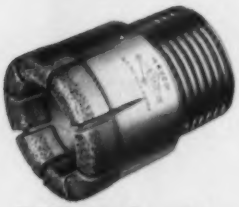
TRUCO CORING BIT



TRUCO CONCAVE BLAST HOLE BIT



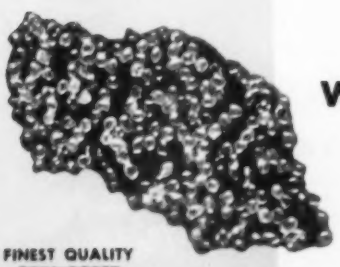
TRUCO PILOT BIT



TRUCO IMPREGNATED CORING BIT

TRUCO REAMING SHELLS

TRUCO STANDARD OIL FIELD BIT



FINEST QUALITY DRILL BORTZ

1910 *Our 46th Anniversary* **1956**

the 20 horsepower miracle

Pioneering was fashionable in Detroit 46 years ago and we, with our pioneer idea of expertly selected industrial diamonds, had lots of company and customers among the new car and truck builders who were springing up at the average (and incredible) rate of half-a-dozen a month.

And, if we needed inspiration and encouragement in our early business years (and sometimes we did) it was right at hand in the social and industrial miracle of one little car that had been launched with an idea just as pioneering as our own.

Until then, horseless carriages had been for the rich. This car was for the common man. It was light, simple, cheap ($1100 for the Town Car in 1910; $260 for the Roadster in 1924) and—indomitable. With a spunky little four cyinder, 20 horsepower engine, it performed impossible feats of transportation and endurance.

Originally, production had been hopefully set at 25,000 cars for the year but in the twenty years of its existence, more than 15,000,000 were built and they changed the pattern of daily life all over the world.

Cars have changed vastly in our time and so have drilling techniques and we have seen our Truco Engineered Diamond Bits develop from a long-past experiment to a world-wide success, acknowledged throughout the drilling industry because of their irresistible cutting power in any formation and because they save rig time and reduce footage costs. May we send you the Truco Diamond Bit Catalog?

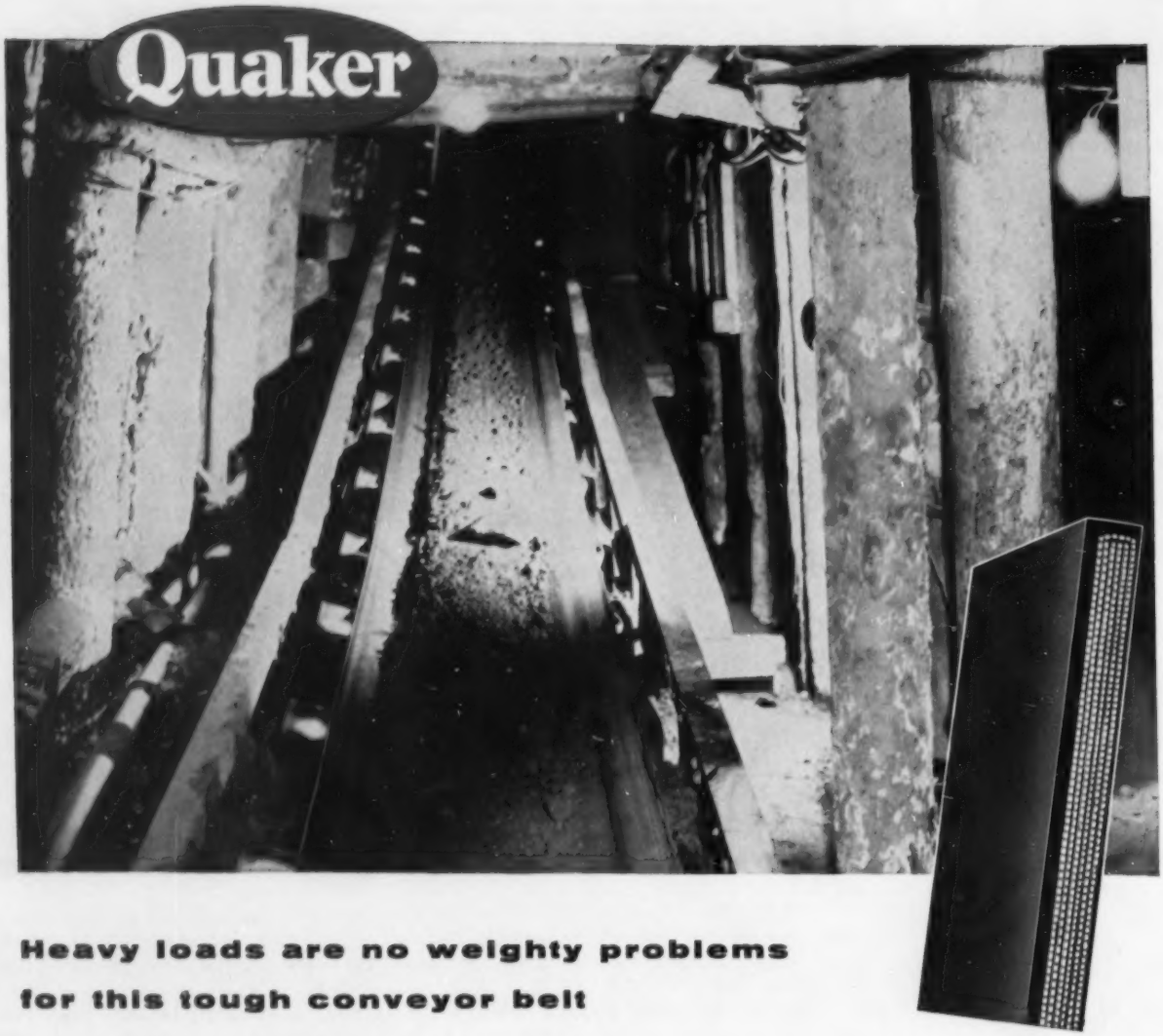
TRUCO DIAMOND BITS

by

WHEEL TRUEING TOOL COMPANY

3200 W. Davison Avenue, Detroit 38, Michigan

WHEEL TRUEING TOOL CO. OF CANADA, LTD.
575 Langlois Avenue, Windsor, Ont., Canada



Heavy loads are no weighty problems for this tough conveyor belt

Your Quaker-Quaker Pioneer distributor can supply not only your standard needs—but also your highly specialized ones. You'll find him a prompt dependable money-saving source for everything you need in rubber products. Write for free brochure and name of your nearest distributor.

This highly flexible all-purpose conveyor belt is plenty tough! It has cover tensile strength of 2500 to 3000 pounds average, friction pull of 16 to 19 pounds and multiple-ply carcass of highest quality duck with skim coats between plies. These are reasons why you can count on this belt to stand up to shock impacts of jagged loads, withstand extremes of weather and exposure, and give long, uninterrupted service under the toughest job conditions. Made in any length. Widths up to 72". Also available in the new high tensile cotton and rayon fabrics.

HKP H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION
Philadelphia 24, Pa.

QUAKER PIONEER RUBBER DIVISION
San Francisco 7, California

Drifts and Crosscuts

This Is Tenth Anniversary Issue

Ten years ago, May 1946, the first consolidated issue of MINING WORLD and *The Mining Journal* was published. That issue was important to the mining industry as was the consolidation of the two outstanding western mining publications. Since the consolidation MINING WORLD has continued to grow. This growth has clearly demonstrated that the policies —advancement and progress of the industry—so long advocated and carried out by the *Mining Journal* were for the best interests of the industry and MINING WORLD has successfully carried them forward.

It was the doctor's order that Charles F. Willis, editor and publisher of the *Mining Journal*, be relieved of the details of his long work for the industry that brought the consolidation about. Fortunately for the industry he has continued as editorial consultant for MINING WORLD. More fortunately he has continued in his dedicated work of "public relations activities relating to western mining and in mining organization work." Long may he keep it up.

With this 10th anniversary, termed variously tin or aluminum, MINING WORLD renews the pledge to the industry: The ideals, policies, and programs to promote improvements in the industry through men, methods, and equipment will be carried forward.

Of the two metals signifying this anniversary, MINING WORLD chooses aluminum to hitch its star to. Aluminum is fast growing, dynamic, versatile, long lasting. MINING WORLD typifies all these, and more too, in the mining publication world.

You Can Find It In The Yearbook

You have just received a copy of the MINING WORLD Yearbook. Keep it where you can get it fast. You will use it countless times during the year ahead. Many industry leaders do and it gives them the answers in one handy, complete, easy-to-use source book.

Here are just a few of the ways that it is used all over the world every day.

Q. Is Jim Slater still the mine superintendent at Uranium Factors? **A.** I think so, but let's check in the Mine Directory section starting on page 145 to see for sure.

Q. What were the five largest open-pit mines in the United States in 1955? **A.** Check the Open-Pit Mine Production Table on page 83 and the Iron Ore Production Table on page 78 to get this answer.

Q. I want to find out who makes plastic pipe which I could use in my new acid circuit; where can I get this information? **A.** Look in the Catalog Index starting on page 295 under the heading Pipe and Fittings—Plastic.

Q. What is the outlook for beryllium under the accelerated atomic energy program? **A.** Find out by reading the special beryllium chapter on page 45 in the Metal and Mineral Review.

Q. I have found that my ore contains selenium; who buys selenium and can tell me about it? **A.** The Ore Buyers Guide on page 139 lists selenium buyers.

Q. Is there more lead mined in Colorado now than during World War II? **A.** That will be in the Colorado Review in the Metal Production Table in the U.S. Mining In 1955 section on page 70.

Q. How much copper was produced at Chuquicamata in Chile in 1955? **A.** The Chilean mining review in the World Mining Report which starts on page 107 gives the tonnage.

Yes, these are only a few ways that the Yearbook serves the mining world. These are the reasons that it is the industry's most widely used source book. Just a minute, how about the special advertisements and catalog inserts that pay the bills so that this book reaches you at no extra charge as part of your regular subscription. The manufacturers have really displayed, described, and pictured their complete line of equipment for you. Study the ads carefully. Compare the various makes before you buy. There's a machine you have been looking for to do just that job faster and cheaper.

You are right. It does take the collective efforts and cooperation of hundreds of leading geologists, engineers, metallurgists, statisticians, and research scientists to gather and compile this information for you.

The splendid cooperation received from industry leaders made the Metals Review the most comprehensive ever. New minerals and metals, boron for example, which literally have been jet-propelled into prominence were reviewed in detail for the first time. The most rewarding and significant fact is that these industry leaders were glad to share their knowledge with you for the collective good of the mining industry.

The U. S. Bureau of Mines is doing a much faster and better job of collecting and distributing data on mineral production on a state-by-state basis. This has made it possible to give more information in the State Metal Production Tables. Accurate figures are available for the first time on metals other than gold, silver, copper, lead, and zinc.

In this period of near war in the middle east, real shooting in North Africa, and armed banditry in southeast Asia, it was only through the loyalty and stick-to-it-ness of important engineers that complete

Continued on page 82

PROLONGED CONFINEMENT COUNTS

...keeping explosives at work behind the burden

A 100 ft. face in solid rock. A 7-hole "alternate pattern" ROCKMASTER shot. At 1/5 second, note how confined explosives force is stressing and shattering rock. Only leaks visible: a few small puffs of gas. Here's real blasting efficiency!

Bottom initiation confines blast. At 1 second, explosives still are hard at work behind burden . . . pushing it out from face. No wild flying rock. No spouting geysers of escaping gas.

Prolonged confinement pays off! No loud air snap. Vibration held to a minimum. Good, controlled throw. Here's a well-displaced 25,000-ton muck pile . . . well broken . . . ready for removal.

PROLONGED CONFINEMENT—the Rockmaster® way

Here's an outstanding example of blasting efficiency. The explosives are hard at work shattering rock . . . not air. The blast pays off by giving faster removal of the overburden . . . in economies all along the line.

Secret of this good shooting is *prolonged confinement*. The blast, initiated at the bottom of the holes with ROCKMASTER millisecond delay electric blasting caps, is confined behind the burden. It's the right combination of ROCKMASTER blasting caps and Atlas explosives that gives—

- **good control**
- **greater efficiency**
- **improved breakage**
- **better public relations**

To get the most out of your blasting methods and your explosives, discuss prolonged confinement with your Atlas representative. You can benefit by his ideas and experience. And get "Better Blasting"—Atlas' informative newsletter on latest methods and materials. Write us to put your name on our mailing list today.

EXPLOSIVES DEPARTMENT

ATLAS POWDER COMPANY

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Capitol Concentrates

Public Lands Committee Gets Armed Forces To Reduce Land Withdrawals

The outbursts by Congressman Clair Engle, and his Public Lands Committee, questioning the necessity for huge withdrawals of public lands in the western states by the military, have been getting some positive results. For instance, they have pried the Air Force loose from 1,000,000 acres in Nevada on the Tonopah Range, which will be made available for the Navy or other military agencies. This is a complete reversal of the Air Force position which previously had been that the Air Force was making complete utilization of the area and no part of it could be made available for any other defense agency.

In addition, the Navy has made a great many concessions with reference to the proposed withdrawals at Fallon, Nevada. Originally, the Navy wanted to withdraw some 2,700 square miles of territory for an indefinite period and to preclude all forms of entry upon the public lands. This was to be done without any public hearings and would have closed the land area the year around from all types of public use.

On the basis of the hearings to date, the Navy has conceded that the withdrawal probably would not be necessary for longer than 10 years; that the reservations sought are really just for the use of the air space above the land and that grazing could continue on a 12 months' basis, allowing for spring and fall round-ups; that established seasons for hunting and fishing would be observed under State laws; that game counts and related measures involving game conservation could be carried out by responsible state officials in the area; that substantial mining operations could be continued and that the area could be opened for recreation and prospecting purposes during week-ends; that the Nevada National Guard could use the area on Saturday and Sunday if desired; and that in a substantial portion of the area prospecting and mining operations could be carried on during some seven months of the year. In addition, the Navy would agree that it would not interfere with water rights in the area.

The hearings up to this point, therefore, have resulted in getting 1,000,000 acres of land from the Air Force, plus substantial concessions from the Navy with reference to the land for which it has applications pending. Our congratulations to Congressman Engle! May he keep up the good work and demand justification for all future withdrawals!

• Senate Strategy Is Explained

The policy in the Senate appears to be to introduce bills covering all phases of the strategic minerals situation separately and in combination and let the Administration and the mining industry choose which they will approve. Separate bills have been introduced to continue all the programs for the minerals included in the Malone-Aspinall Act of 1953, plus a new program for antimony and a bill to raise the floor for mercury. Each individual bill is sponsored by a Senator from a state in which the mineral is of greatest economic importance. As an example, Senator Scott of North Carolina sponsored the mica bill and Senator Goldwater of Arizona the asbestos bill. In each case they were joined by other Senators. One advantage of having a separate bill for each mineral is to get separate agency opinions on the individual mineral or metal. Actually, no separate bill could hope for the necessary political support for passage, say Congressional experts, but a bill covering all the minerals would have a much better chance.

• Relief Denied Fluorspar Producers

The fluorspar industry's petition for "escape clause" relief through an increase in the tariff rate on acid-grade fluorspar was denied on March 20 by President Eisenhower.

The six-man Tariff Commission, after extensive hearings, had rendered a split decision with three members recommending "that the tariff concessions granted in General Agreement on Tariffs and Trade be withdrawn for an indefinite period" and the remaining three members saying "there is no sufficient reason for a recommendation to the President for action in this case." The President decided to accept the latter report as the findings of the commission. Once again a branch of the domestic mining industry has been sacrificed on the altar of the so-called free trade policy.

The domestic fluorspar producers still have pending an application to the Office of Defense Mobilization for an import quota limitation under the National Security Amendment contained in the Trade Agreements Act of 1955.

• Tungsten Program Is Nearing The End

Shippers under the domestic tungsten purchase program have been notified by General Services Administration that the program is drawing to a close. On March 2, 1956, GSA stated, only 441,196 units remained to be purchased out of the original quota of 3,000,000 units. From December 31 to March 2, 178,829 units were purchased.

Effective April 9, it became necessary for all shippers to furnish GSA offices with advance notice in writing concerning the quantity (in short ton units) of all offerings, and no shipments are to be made before a written clearance is received from GSA. The control of the actual closing date of the program will be handled from the Washington office of GSA, but an effort will be made to close out all regions on as nearly the same date as possible.

• Compulsory Inspection Bills Are Opposed

The attention of the mining industry again should be called to bills for compulsory inspections and investigations in metallic and nonmetallic mines and quarries. This is the opening wedge to extend the

Continued on page 83

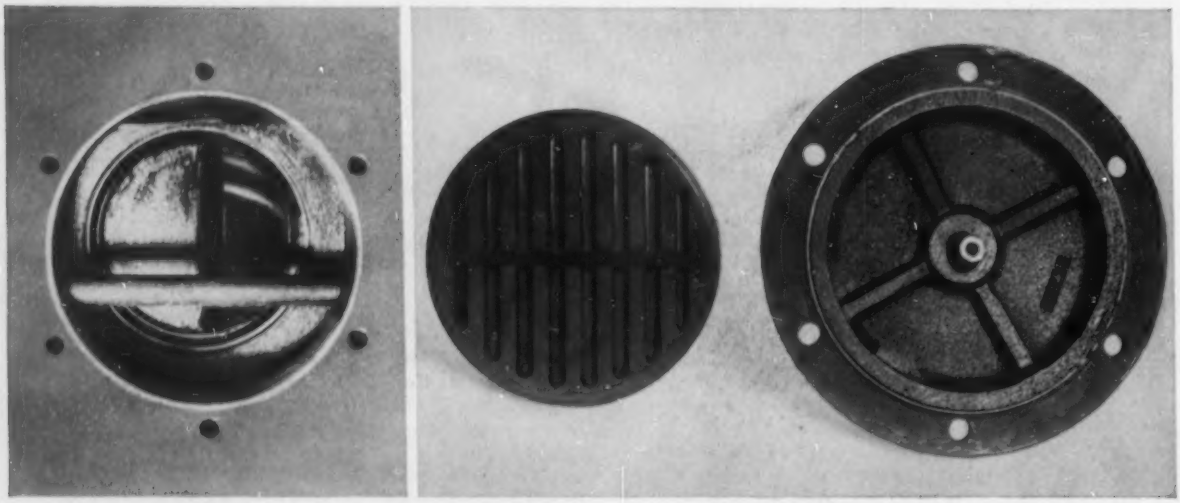
The Engineer's Field Report

CASE HISTORY

LUBRICANT *Calol Multi-Service Oils*

LOCATION *Arizona*

Compressor valve parts free of deposits after working 40,680 hours in constant dust



NOTE CLEANLINESS of this valve port, channel valve and cover (left to right) when removed for first time from a two-stage air compressor...after 40,680 hours of work! Lubricated with Calol Multi-Service Oil since installation 11 years ago, the unit supplied air—5000 cubic feet per minute—for a giant Arizona copper mine. Compressor was housed in open shed where dust and grit were always present in the air...yet there was practically no wear or formation of deposits. Since moved to another mine site, the compressor still has all its original parts.

Calol Multi-Service Oils keep wear rates low and carbon deposits to a minimum in any type of reciprocating compressor. Also recommended for pumps, diesel engines and enclosed gears. These oils are available in several different grades to meet all conditions and requirements.

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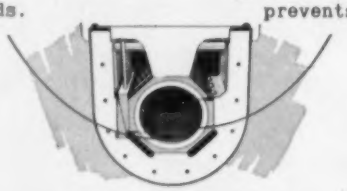
FREE CATALOG: "How to Save Money on Equipment Operation" will be sent on request to Standard Oil Company of California, 225 Bush Street, San Francisco, California.

FOR MORE INFORMATION about this or other petroleum products...or the name of your distributor, write or call any of the companies listed below.

Why CALOL Multi-Service Oils cut deposits & costs

Contain oxidation-resistant compounds.

Detergent keeps contaminants suspended in oil, inhibitor prevents foam.



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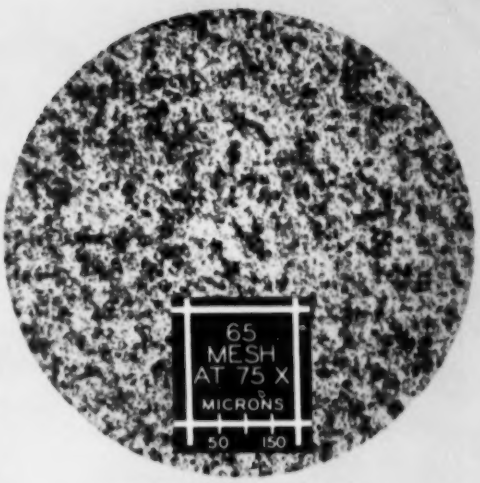

UNFLOCCULATED SLIMES

AFTER ADDING AEROFLOC REAGENTS

Perhaps you've already heard how effectively AEROFLOC Reagents speed up and improve complete settling of concentrates, tailings or leach residues—thus conserving values in thickener overflow and reducing solids in plant effluent.

Perhaps you've already seen data on how AEROFLOC Reagents increase filtration rates, make filter cakes firmer and more porous, reduce blinding of filter cloth, aid washing.

But did you know that AEROFLOC Reagents

- ✓ Are effective at very low concentrations—0.1 to 5 ppm, or 0.01 to 0.1 lb. per ton dry solids.
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- ✓ Require no elaborate feeding equipment.
- ✓ Can be added wherever plant tests show best results. Stagewise addition usually not necessary.

Three AEROFLOC Reagents—#548, 552 and 3000—are now available. You should test all three to determine which is most efficient on your mill. We'll be glad to provide samples for bench tests and the services of a Cyanamid Field Engineer to work with you on plant tests. The handy coupon is for your convenience.

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One Responsibility

Crushers, Screens, Feeders, Ball-Rod Mills, Classifiers, Jigs, Pumps, Samplers, Agitators, Conditioners, Flotation, Thickeners, Filters, Dryers, Ore Testing and Mill Design Services.

How DENVER SRL (Soft Rubber Lined) PUMPS CAN CUT YOUR PUMPING COSTS...for abrasive pulps or tailings

1. POWER COSTS CUT

Denver SRL Pumps often use less than one-half the brake horsepower required by other pumps in similar service. This is the result of simplified design and high efficiency of molded rubber parts. **This means substantial savings for you in power costs and maintenance.**

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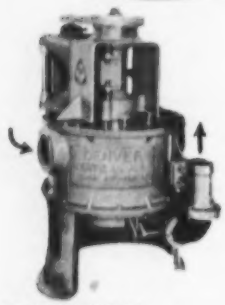
Because molded rubber parts are highly resistant to corrosion and abrasion, case history records show where Denver SRL parts lasted up to 15 times longer than parts on pumps previously on the same service. This means increased production, savings for you in maintenance costs—and, more important, reduced down time.

3. A PUMP FOR EVERY JOB

Denver SRL Rubber Lined Pumps are available to you for standard or heavy duty service and with capacities up to 2400 g.p.m. You can choose exactly the right pump that will do your pumping job most efficiently, most economically. Parts for all sizes are kept in stock for fast service.

If you have abrasive or corrosive material to pump, you can make substantial savings by using Denver SRL Rubber Lined Pumps. For complete information about what Denver SRL pumps can do for you, **WRITE TODAY FOR FREE BULLETIN P9-B8. MOST SIZES OF SRL PUMPS IN DENVER STOCK.**



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Sizes from ¾" to 4". Also Denver Adjustable Stroke Diaphragm Pumps from 2" to 8", simplex and multiple units.

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Mining World

THE IMPORTANT MINING MAGAZINE EVERYWHERE

May 1956

INTERNATIONAL PANORAMA

MONTREAL, QUEBEC—The Canadian government has freed controls on gold so that any one will be able to buy, sell, export, and hoard gold mined in Canada.

WASHINGTON, D. C.—The Office of Defense Mobilization has reported that the minimum stockpile requirements for aluminum have been met. Minimum requirements cover the next five years.

NDOLA, NORTHERN RHODESIA—Capacity of the Ndola Copper Refineries Limited is to be doubled to 110,000 annual long tons by 1960. First production at the refinery, now under construction, is set between 55,000 and 60,000 tons beginning in 1958.

JUNEAU, ALASKA—DeCoursey-Brewis Minerals Company has started its new mercury kiln. The first 1,500 flasks have been sold at $255.00 per flask delivered at Seattle, Washington.

THETFORD MINES, QUEBEC—National Asbestos Mines Limited, a subsidiary of National Gypsum Company will develop a new asbestos mine near here and build a large plant to produce asbestos fiber. Production is expected in 1958.

DENVER, COLORADO—Midwest Consolidated Uranium Corporation has been purchased by Cog Minerals Corporation. Cog is a subsidiary of Colorado Oil and Gas Corporation. Midwest's six mines in Colorado and Utah will be operated by Cog.

CEDAR CITY, UTAH—Columbia Iron Mining Company has purchased 18 iron ore claims for $1,000,000 in the Iron Mountain district. Columbia is a subsidiary of U. S. Steel Corporation.

SAN FRANCISCO, CALIFORNIA—Steel production in the United States reached an all-time weekly peak of 2,447,000 ingot tons in mid-March.

OTTAWA, CANADA—Hilton Mines Company, Ltd. has awarded a $16,000,000 contract to the Foundation Company of Canada, Ltd. for a crushing plant, magnetic separation plant, and agglomeration plant to produce 600,000 annual tons of iron pellets. Pickands Mather and Company, Jones and Laughlin Steel Corporation, and Steel Company of Canada Ltd. own Hilton Mines.

HENDERSON, NEVADA—Titanium Metals Corporation is expanded titanium sponge plant capacity by 67 percent here to 6,000 annual tons. Ingot melting facilities are also being expanded. The plant additions will be completed late this year.

MT ISA, AUSTRALIA—Mary Kathleen Uranium Ltd. will build a £A10,000,000 uranium mill to process Mary Kathleen and other ores to fill a contract for more than £A40,000,000 worth of uranium concentrate with the British Atomic Energy Commission. The mill will be in operation in 1959. Mining will be open pitting.

SAN FRANCISCO, CALIFORNIA—The office of Defense Mobilization has announced that minimum stockpiling goals (five-years) have been reached for aluminum, tin, tungsten, zinc, lead, industrial diamonds, and mica. The long-range stockpile has been completed for vanadium, asbestos, and graphite.

BELL ISLAND, NEWFOUNDLAND—Canada's second largest mine—Dominion Wabana Ore Ltd.—set a new daily production mark of 11,980 tons of iron ore in late March. The objective is 12,000 daily tons.

KITWE, NORTHERN RHODESIA—Chibuluma Mines Limited has started production of copper-cobalt ore. It is the first new mine in the Copperbelt for 25 years and at capacity operations will produce 16,000 tons of copper and 500,000 pounds of cobalt annually.

SAN ANTONIO, TEXAS—Climax Molybdenum Company's subsidiary San Antonio Mining Company, Inc. has signed a contract with the United States Atomic Energy Commission to deliver uranium ore from its Karnes County deposits from July 1957 to March 31, 1962.

Anaconda's Uranium Investment is $22,991,263

The Anaconda Company to the end of 1955 had made capital investments totaling $22,991,263 at its New Mexico uranium mines and mills.

Uranium mining and milling operations have been on an accelerated basis with the enlarged carbonate leach plant in operation since mid-1955. The first of two units at the new acid leaching mill to treat sandstone ores from the company's Jackpile mines went into operation in December and the second in January 1956. Jack Knaebel is manager of the company's New Mexico operations.

Toquepala Plant Contracts Won by Utah Construction

Utah Construction Company has been granted the contract for erection of a power plant, concentrator, railroad, and other main mine surface structures at the Toquepala, Peru properties of Southern Peru Copper Corporation. Morrison-Knudsen Construction Company of Boise, Idaho will be associated in the project, with Utah Construction as sponsor.

Toquepala is a $200,000,000 open-pit project which is being developed by American Smelting and Refining Company, Cerro de Pasco Corporation, Newmont Mining Corporation, and Phelps Dodge Corporation. Under the arrangements, the Toquepala property, together with the Quellaveco property and the Cuajone property, have been transferred to a new corporation, Southern Peru Copper. About five years will be required for construction.

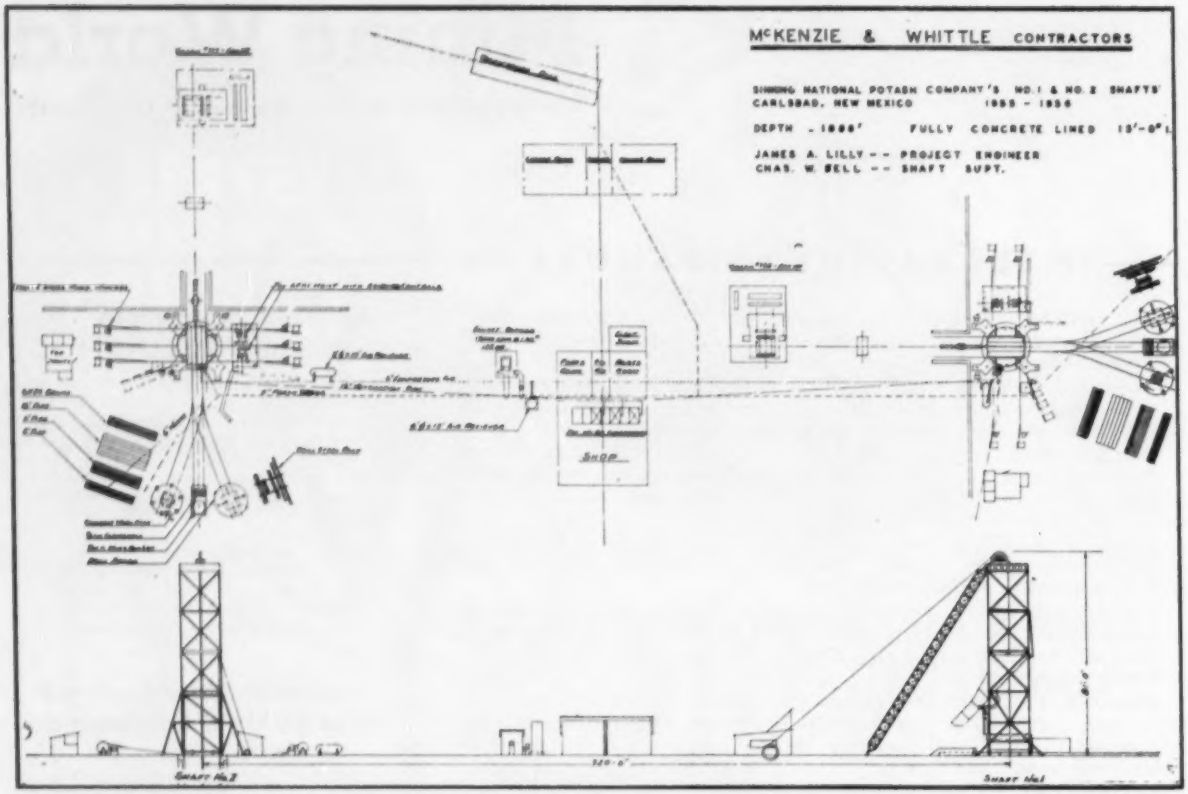
Palawan Quicksilver To Operate Two Kilns

Palawan Quicksilver Mines, Inc. has purchased a second Gould rotary kiln for its Palwan Island, Republic of the Philippines mercury mine. The kiln is scheduled for shipment in early May from San Francisco by Gordon I. Gould and Company. Palawan plans to have it in operation by mid-year.

In March the company furnaced 2,386 tons of open pit and underground ore and recovered 6.42 pounds per ton for a total production of 202 flasks of mercury. Japan has been the buyer of this mercury.

George Newman, vice president and general manager, has returned to the Philippines after a business trip and inspection of United States mercury mines and furnaces.

In June—An Analysis of Helicopter Transportation Costs


McKENZIE & WHITTLE CONTRACTORS
SINKING NATIONAL POTASH COMPANY'S NO. 1 & NO. 2 SHAFTS
CARLSBAD, NEW MEXICO 1955 - 1956
DEPTH - 1886' FULLY CONCRETE LINED 15'-0" ⌀
JAMES A. LILLY -- PROJECT ENGINEER
CHAS. W. BELL -- SHAFT SUPT.
SHOP
320'-0"
SHAFT No. 2
SHAFT No. 1

SURFACE PLANNING is the key to record Potash Basin shaft sinking by McKenzie & Whittle Contractors. Note the air hoists at each shaft collar that power the clam shell mucking buckets on the bottom of each shaft. The concrete work cage, drill jumbo, and mucking tools each have a particular track for quick tramming to collar. Other supplies are readily available. The hand winches are for moving shaft's steel concrete forms. Muck is dumped directly to trucks and hauled to dump.

How A Seven Cycle System Sinks Potash Shafts At Record Speed

By JAMES A. LILLY

A new shaft-sinking system has been setting new shaft-sinking records in the Carlsbad, New Mexico potash basin since September 1955. And this is only the beginning as each month the previous record has been bettered.

A Texas contracting firm—McKenzie and Whittle Contractors—using maximum mechanization with simplicity and repetition has set the records in sinking the two, vertical, round, concrete-lined, 15-foot 0-inch diameter shafts. The two identical shafts are 320 feet apart with a concrete lining varying in thickness from 24 inches at the collar (in earth) to 6 inches in the non-reinforced section in the salt in which the potash beds occur. Each shaft will be 1,886 feet deep.

JAMES A. LILLY

National Potash Contracts Shaft

When the industrial combination of Pittsburg Consolidation Coal Company and Freeport Sulphur Company entered the United States potash business as the National Potash Company, they initiated construction by letting a unit-price contract for sinking two shafts. From the 13 bids solicited, the award was made to the joint venture of McKenzie & Whittle Contractors.

McKenzie Construction Co. of San Antonio, Texas and Whittle Construction Co. of Dallas, Texas are experienced firms at tunnel and related work but had not previously sunk a shaft of

Mr. Lilly is project engineer for McKenzie & Whittle Contractors sinking the National Potash Company shafts near Carlsbad, New Mexico.

this depth. Relying on the basic principles of contract construction (good planning, good personnel, and good equipment), sinking was started in May 1955.

The collar section was sunk by conventional methods to a depth of 100 feet and concreted upon receipt of special forms in July 1955. Headframes, hoists, and other specialized equipment were erected in late July and August with deep shaft sinking operations underway in September. During this first month, the previous Potash Basin record of 157 feet of concreted shaft was bettered by sinking 160 feet in each shaft. The second month 220 feet in one and 200 feet in the other were completed.

Sinking operations in November and December were interrupted by water sealing, grouting, pump station development, and driving the interconnecting drift on the 500 foot level.

Actual sinking to the 1,000-foot level averaged 8.0 feet per shaft per work day. Below this level the rate of advance of completed concrete-lined shaft is 10 feet per shaft per day worked.

Set Potash Sinking Records

During the 30-day working period from February 24th through March 29th, Shaft No. 1 was sunk 300 feet, from 907 feet to 1,207. No. 2 was also sunk 300 feet, from 807 feet to 1,107. Both shafts were completely concrete lined with guides installed.

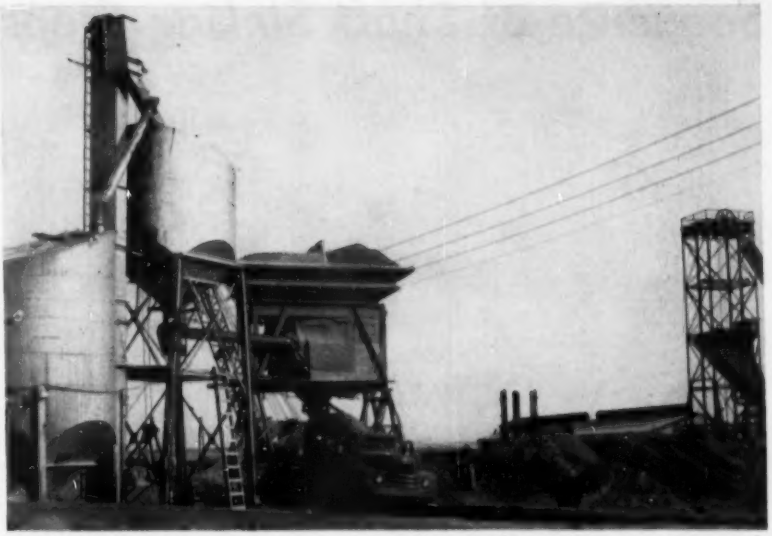
Further equipment refinements and improvements are being made which continually reduce the time cycle. (During the six day week ending March 10, 1956, 80 feet of shaft were sunk and concreted in the No. 2 shaft).

Thorough and complete exploratory drilling by the National Potash Company has proven to be most accurate. A full set of cores available for examination by all bidders coincided to actual conditions within five feet. The predicted water occurrence was easily handled and confined to the expected limits.

Details of System

The McKenzie-Whittle shaft sinking system as shown in the operational sequence sketches on the next two pages is based on simplicity and repetition with seven basic steps. Note that the same crew is used to maximum efficiency no matter what the cycle.

This system has been designed after the "Bain" system developed by C. Kremer Bain, long-time Lead Belt (Missouri) St. Joseph Lead Company mine superintendent. Mr. Bain is now a consulting engineer with headquarters in St. Louis, Missouri, and is a consultant on this job.



CONCRETE BATCH PLANT on surface with a 4-cubic yard transit mixer speeds shaft lining. The mixer hauls directly to the collar of either of the two shafts. Adequate stocks of cement, sand, and rock prevent mixing delays.

All piping for ventilation, compressed air, water, and pumping is carried within the concrete lining under the system. The six guide beams, equally spaced inside the shaft and attached to similar steel beams imbedded in the concrete serve as cross head and equipment guides and will be used to support buntons for permanent skip and hoist guides and manways.

The drill jumbo insures correct pattern drilling with a minimum of overbreak for a maximum depth round.

The heavy, ½- and ⅝-inch steel concrete forms placed right behind each 20 feet of excavation greatly reduce the trouble and hazard from bad ground. The forms also protect freshly poured concrete from hard shooting.

With the clamshell mucking hoists on the surface, there is no noise or fog in the bottom during mucking. Other types of air hoists and clamshell mucking necessitate track in the shaft. This system means no lost time in setting such tracks, makes hoisting of loaded buckets safer, and allows heavier shooting.

What's Wrong In U. S. Sinking?

Acknowledging that no two jobs are directly comparable, McKenzie &

70 Men + 30 Days = 600 Feet of Shaft

Total personnel required to sink the two shafts on a three-shift per day basis six-days per week is: Supervision and management, eight; direct production, 48; and supporting maintenance, 14. Total 70.

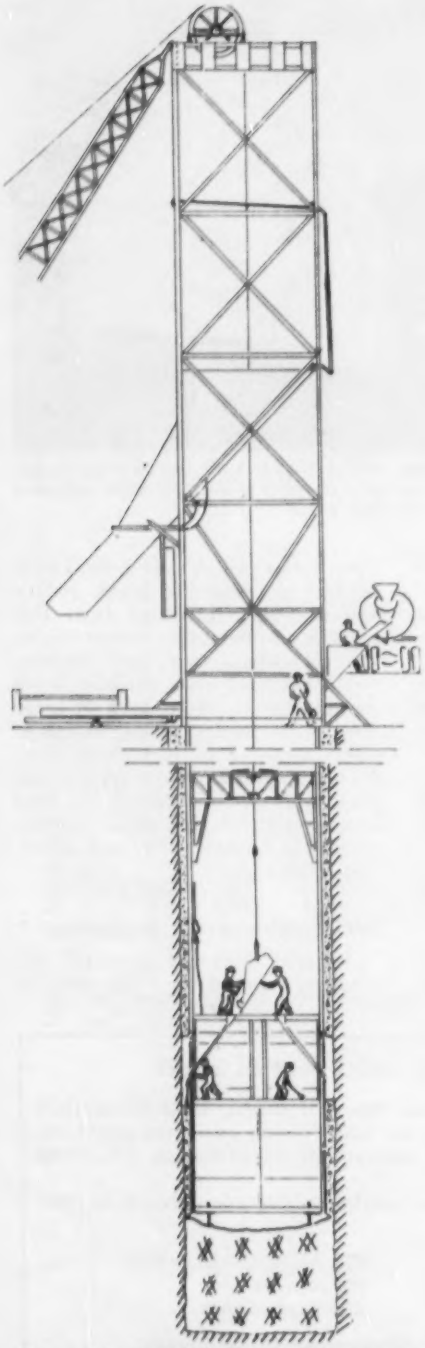
Working under A. F. Of L. union contracts the breakdown of personnel is:

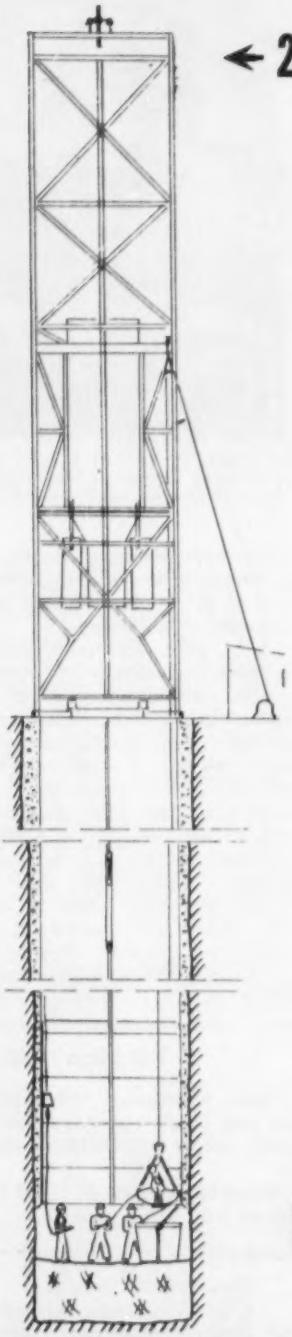
Supervision and Management
- *One Project engineer*
- *One Shaft superintendent*
- *One Equipment superintendent*
- *Three Assistant superintendents*
- *One Office manager*
- *One Clerk*

Direct Production
- *Six Mine foremen*
- *Six Hoist operators*
- *Six Mucker operators*
- *24 Miners*
- *Six Toplanders*

Supporting Maintenance
- *One Master mechanic*
- *Three Yard mechanics*
- *Three Compressor operators*
- *Three Electricians*
- *Three Oilers*
- *One Apprentice mechanic*
- *One Concrete truck driver*
- *One Laborer*

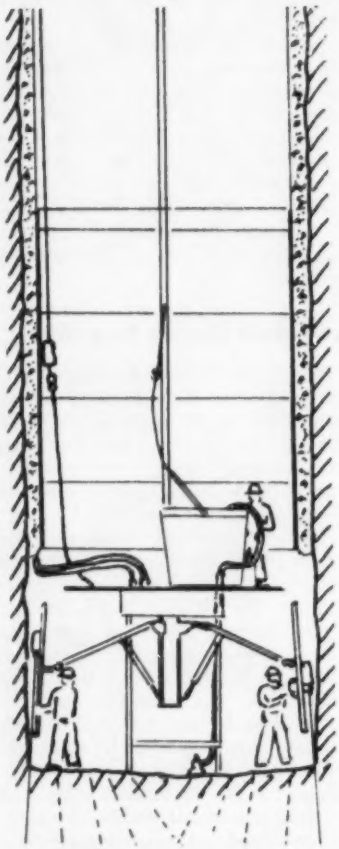
Sequence of Shaft Sinking Steps . . . . .





1. ***Pour 20 lineal feet of concrete and rig-out work deck:*** *The work deck position is varied to place the concrete in the three different form door elevations. Chutes convey from center to forms. The crosshead is used without stops. A 1½-cubic-yard laydown concrete bucket is loaded from a 4-cubic-yard hopper with shaft cover doors closed. Rate of pour is 20 cubic yards per hour. One pneumatic vibrator is used to consolidate the concrete. With pour complete; the work deck is lowered, jacks and template are loosened and fastened to the bottom of work deck and removed from shaft. Forms remain as concrete protection.*

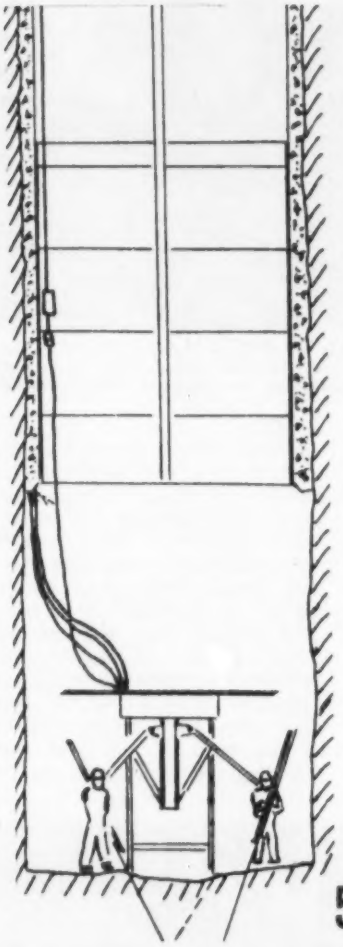
2. ***First mucking cycle:*** *Using a ½-cubic-yard clamshell loading two 76-cubic-foot muck buckets the operator stands on the muck pile with an electric panel controlling, by means of relays and solinoids, two air-hoists located near the shaft collar. Two miners work with the operator controlling the tagline ropes.*

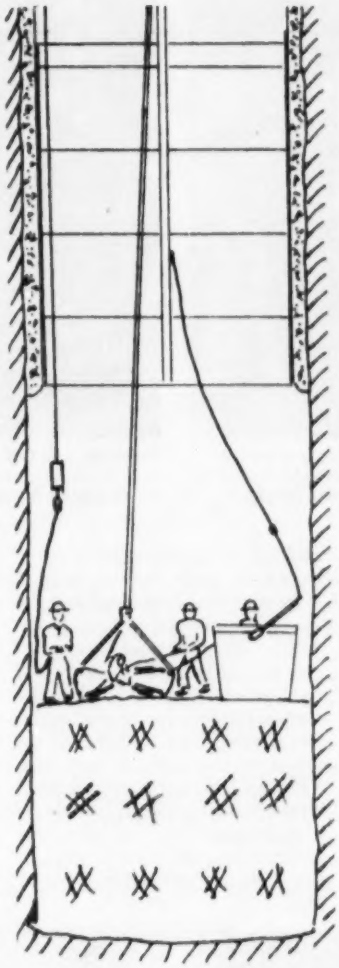


3. ***First drilling cycle:*** *Use 12-foot steel and pull 10 feet. Using a jumbo with air-motor-feed drills and hydraulic-actuated boom-arms an accurate "v" pattern of 68 holes is drilled with a 6-foot and 12-foot steel to a depth of just over 10 feet. String loading 12 sticks of powder to the hole and firing with six periods of millisecond delays the round consistently pulls 10 feet. Followed immediately by the Second mucking cycle: With about 5 feet of swell, repeat steps outlined in No. 2.*

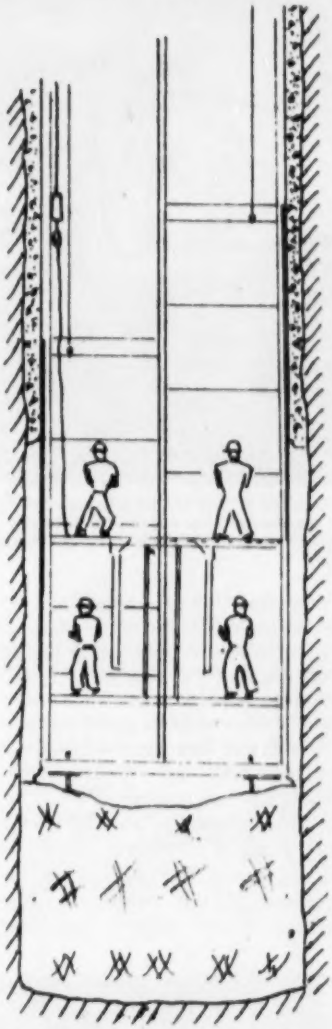
. . . . . In McKenzie & Whittle System

4. ***Second drilling cycle:*** *This round is started from 22 to 25 feet below the forms.*





5. ***Level off:*** *Performed with usual mucking tools to a depth of 21 feet below the forms.*



6. ***Set forms:*** *Work deck loaded with guide beams, vent pipe, compressed air pipe, drill water pipe and waste water pipe, and with template fastened is lowered to the bottom of the shaft. Guide beams and pipe are hung from those above. Template is set and the beams centered and plumbed. Jacks hold the template in true alignment. The bottom forms are lowered and joined at template. Form wedges are removed from forms and forms lowered into position and rewedged. Work cage is then hung from guide beams above and the hoist rope sent to the collar for the concrete bucket, ready for the pour.*

Total time for 20 feet of concreted shaft varies from a best time to date of 40 hours to an average of 50 hours.

Cycle Crews

POUR CONCRETE

One foreman—on bottom
Three miners—on bottom
One miner—at collar
One toplander—at collar
One mucker operator—at batch plant.

DRILLING

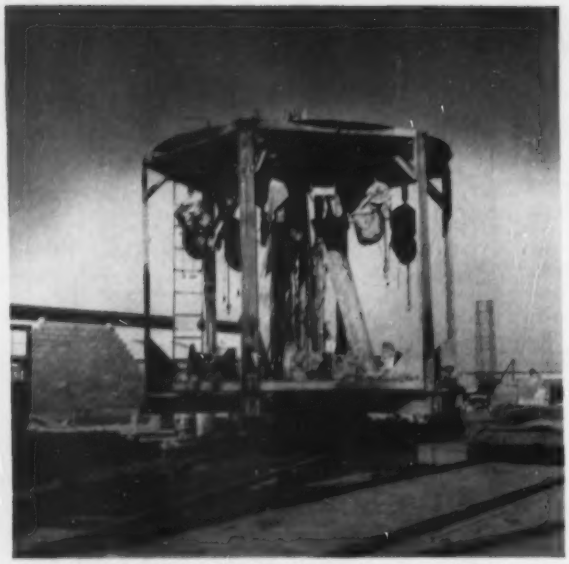
One foreman—on bottom
Four miners—on bottom
One toplander—at collar
One mucker operator—on surface, level dump and haul road.

MUCKING

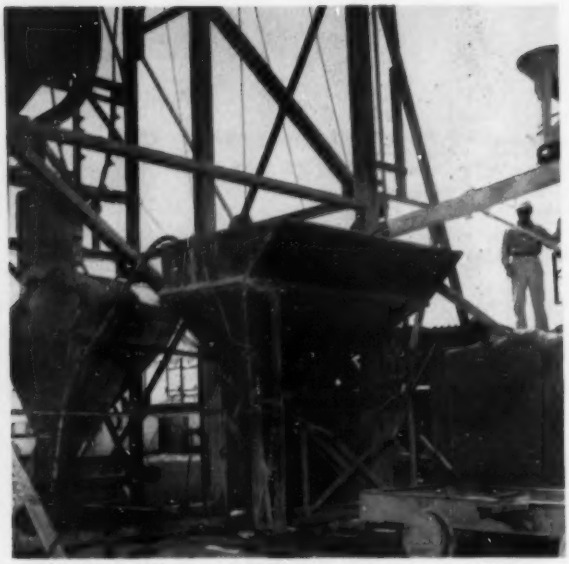
Foreman—on top or bottom
Two miners—on bottom
Two miners—on surface, collar-clean cage-drive truck
One toplander—at collar
One mucker operator—on bottom.

SETTING FORMS

Foreman—on bottom
Four miners—on bottom
One toplander—at collar
One mucker operator—on surface, level dump.



CONCRETE WORK DECK and template on surface showing the chutes used for conveying concrete from center into forms. Twenty cubic yards per hour poured and vibrated in place.



CONCRETE ON WAY TO BOTTOM in a 1½ cubic yard bucket. It is delivered by pre-mix truck (upper right) from batch plant, flows into storage bin (center), and to bucket.

Whittle feel that in far outdistancing any other sinking performance in the Potash Basin, the credit goes to the competitive system as compared with cost-plus methods previously used. Without the stimuli of profit and loss, it is believed that more effort often goes into sales than toward active, efficient job management.

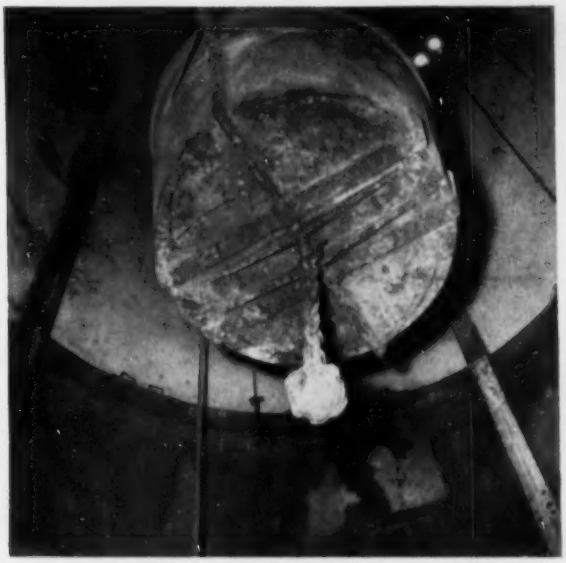
Having weathered an active construction life of 41 years in heavy and building work, and subject to the limitations of this experience, McKenzie & Whittle believe that deep shaft sinking as a particular type of construction is, with few exceptions, most primitive. Specifically, the charges are summed up as follows:

1. While 50-cubic-yard monsters alter the surface of the earth and giant mechanical moles literally devour the bowels of the earth, man's broad back still stands supreme as the shaft sinking tool. With all of our technological advance, shaft sinking stands as a monument to the cost-plus operator, the extra curricular activity of an otherwise efficient mining industry, a sizeable blemish on our mechanized society.
2. In this one field, increased labor costs have only resulted in reduced production. Only in shaft sinking can increased labor costs be directly tied in with loss in efficiency. As United States sinking rates fell from 400 feet per month in the 1920's, the rate continually increased in cheap labor countries to better than 700 feet per month. United States rates of 200 feet per month are now considered excep-

CONCRETE BUCKET is lowered to the top of the work deck. The miner shown here opens the bottom door and the concrete flows through chutes directly into the circular steel forms.

MUCKING CYCLE starts as this 1½ cubic yard clam shell and two 3 cubic yard muck buckets are lowered. Clamshell is controlled from bottom, but air hoists are on surface.

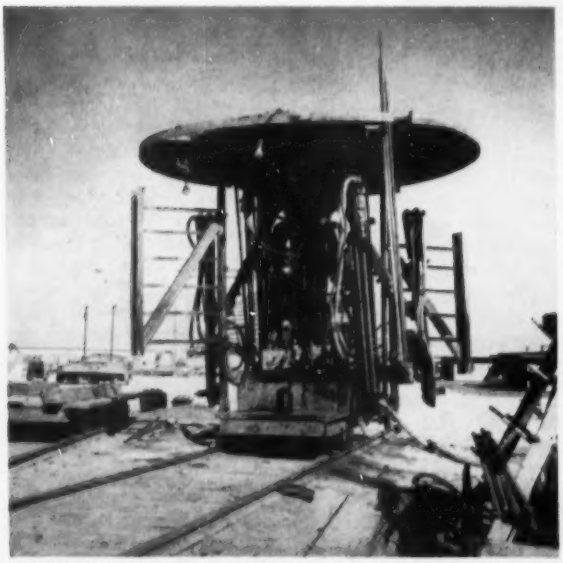
MUCK IS LOADED into buckets by this clamshell. Miner swings it over bucket to drop load. Operator, on muck pile, by electric controls opens, closes, raises, and lowers clamshell.



LOADED BUCKET up the shaft as a second is loaded on the bottom. Note the dark steel forms below the white concrete lining. One of four guide beams shows clearly at left.

tional. When South Africans with shovels can do a job three times as fast as the best United States rate, then someone should take notice.

3. The blame rests most heavily on the equipment manufacturers who stand most to gain by improvements. All labor saving equipment now in use was a common tool before the turn of the century. Patented clamshell and grapple arrangements were everyday tools in 1900 and an insult to progressive America that fees should still be chargeable just because someone belatedly got around to using them in this industry. That this country would allow someone to charge a patent fee for using an overhead crane underground illustrates the general sorry state of affairs of United States shaft sinking.
4. Mining companies that would not consider building their own access railroad, blandly sink their own shafts. However, they are not to be overly criticized. The six or seven contractors who profess experience in this field, demanding cost-plus contracts and doing it like their Grandpa did, display anything but that which has made the American construction industry worthy of world acclaim. Examples of abandoned $1,000,000 holes, four years to sink 1,600 feet, and the introduction of shaft freezing methods by a mining company instead of the contracting agent all point up the absence of grey matter in this branch of the construction industry.



DRILLING JUMBO on surface clearly showing the four air-motor-feed drills mounted on hydraulic actuated boom-arms. Guide shoes are at far left and far right.

CHANGING DRILL STEEL on the bottom. A 12-foot round with two steel changes, 6- and 12-foot, pulls 10 feet. A 68-hole pyramid cut loaded with 816 sticks of powder is used.

AEROFALL MILL in operation at East Daggafontein Mines Ltd., Union of South Africa. Feed of mine-run ore by belt in lower center. Note large chunks. Large diameter, but narrow mill in center. Dust cyclones at upper right.

Aerofall Mill Tests In S. Africa Prove:

- ***Mill building costs cut 20 to 30 percent***
- ***Operating costs can be cut 30 to 50 percent***
- ***Increase gold recovery as much as 4.2 percent***
- ***An increase of U_3O_8 Recovery by 9.5 percent***
- ***At coarser grind of an increased recovery***
- ***Reagent consumption cut with higher recovery***

By LEONARD A. WASPE*
Johannesburg,
Union of South Africa

For a few years after the end of World War II, metallurgical circles in South Africa debated the question whether reduction plant (milling) practice had been reduced to or very close to the irreducible minima, especially in physical terms. The point of the debate was sharpened by the proving of the Free State gold field, by the delineation of extensions in the Klerksdorp area, and extensions of the West Witwatersrand line.

In rapid succession there were introduced the rod mill, the hydrocyclone, and two continuous concentrating devices—namely, the plane table and the counter-rotating belt, (all, except the last, have been reported in the columns of MINING WORLD: The rod mill in January 1952, the hydrocyclone in January 1954, the plane table in January 1955. The counter-rotating belt was described in the Anglo American Corporation of South Africa Ltd.'s quarterly—*Optima*—September 1954). In addition, other devices were introduced to facilitate operational control and to ease demands on a restricted labor force.

To this list of innovations must now be added the Aerofall mill equipment, the testing of which was initiated in the reduction plant of East Daggafontein Mines Ltd. of the Anglo American group on September 1, 1954. These tests have been successful, as have others conducted on gold-uranium ores. Accordingly, the introduction of the Aerofall mill equipment must rank with the most important since the start of gold production from Transvaal conglomerates in 1884.

The gold mining industry everywhere, and in South Africa particularly, is confronted with three major problems: high capital costs, high operating costs, and what has only recently been alleviated—a serious labor shortage. The results of the tests conducted suggest very strongly that the application of the Aerofall mill would induce benefits in varying degrees.

Once an orebody has been proved by exploration and the decision taken to proceed to production, the problem of high capital costs has to be accepted as the inevitable sign of the times. The problem has been adequately analyzed and discussed in company statements and reports. With current standard equipment, the capital cost of a reduction plant treating 50,000 tons monthly is about £700,000, 100,000 tons about £1,000,000,

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and 150,000 tons about £1,300,000. Costs for all equipment from headframe to thickening has been estimated at £1,000,000, £1,640,000, and £2,200,000 for respected tonnages outlined above.

High working costs are the constant shadows of prevailing economic conditions on current gold mining operations, the final product of which—gold, money itself—is convertible over lengthy periods at fixed levels of exchange. Table Nos. I, II, III, and IV present a statistical picture of recent tendencies in operating or working costs and profits.

Without taking into account improved extraction of gold and, where applicable, of uranium oxide, (as is discussed later in this report), tests of the Aerofall mill equipment indicate a reduction of plant operating costs from about 30 to 50 percent, perhaps more. In addition, there is the benefit of smaller demands by reduction plant operation on the overall labor complement.

How Aerofall Mill Operates

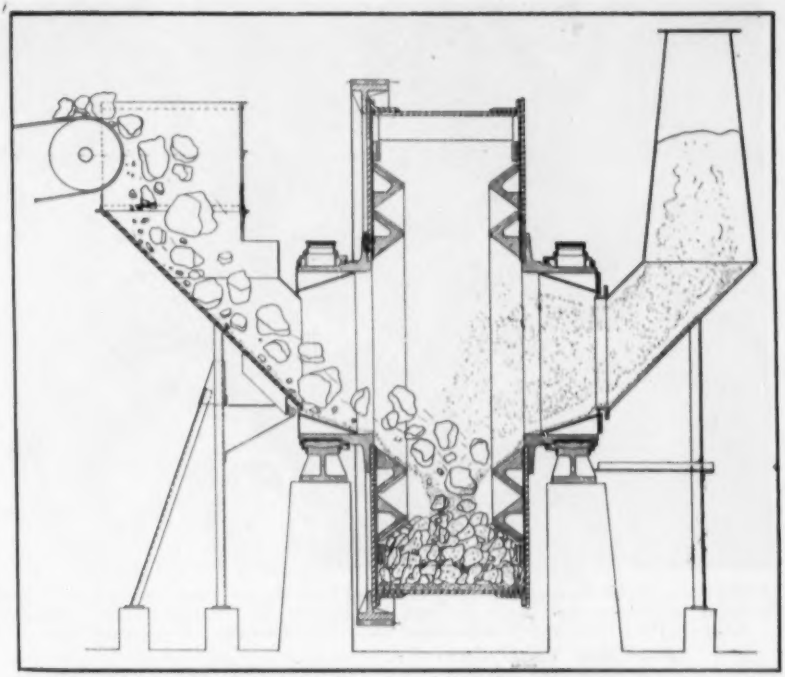
The Aerofall mill is a large-diameter, short-length, grinding or reduction unit—from 5 to 28 feet diameter—with the widths ranging from 2 to 8 feet, operated at peripheral speeds of 8 to 20 feet per second. This mill is capable of reducing run-of-mine ore with a coarse limit of 36 inches to varying orders of minus-200-mesh in a single pass, either in open or closed circuit. It can be operated with either screens or pneumatic classifiers, and is always operated "dry". It can be operated with, or without, steel-ball grinding media. Accordingly, crushing equipment, pumps, conventional stage-grinding units, and other equipment are dispensed with. There is also considerable saving in conveyor-belting and structural materials.

Table No. I
Operating Costs For South African Gold Producers[1]

Year	*Shillings Per Ton*	*Shillings Per Ounce*
1949	27.000	136.750
1953	36.500	187.583
1954	38.667	189.917
1955	40.417	189.000

1. Recent costs include abnormally high costs of new producers.

Factors facilitating the extreme range of reduction in a single-pass through the unit are the internal design, the high operating speeds with the consequent highly efficient fine grinding zones, and the impact crushing action in the bottom comminution zone. The various zones are illustrated in an accompanying diagram. This shows that most of the reduction



IDEALIZED CROSS SECTION of an Aerofall mill operation. Mine-run ore discharges from belt into mill while the finely ground ore particles are "air swept" from the mill at right. Balls can or cannot be used to aid grinding.

is effected by the grinding action in the "false toe", and abrasion zones.

With the exhaust air-draft passing through the mill, when it is operated in closed-circuit with pneumatic cyclone classifiers, the mill itself acts or functions as a classifier to a considerable degree. Turbulence within the unit contributes to this action. An important consideration in pneumatic classification is the relatively light separation medium of air, even after allowing for the effects of its velocity. In addition to facilitating a "sharp" cut or classification, the relatively light medium permits differential grinding—that is, selective or preferential grinding without sliming of the heavier mineral constituents of the ore, and to an extreme degree if necessary, while avoiding an undue formation of gangue slime. This selective or preferential grinding naturally increases substantially, or appreciably, subsequent extraction in the leaching processes for both gold and uranium. Tests confirm this and indicate a considerable reduction in reagent consumption.

Another important advantage of the Aerofall mill equipment is the "clean" dry-grind product, free of the "clouding" often associated with "wet" grinding and particularly with "wet" grinding in alkaline or alkaline/cyanide solutions in the reduction plants of gold and gold-uranium mines. The "clean" product obviously facilitates improved recovery and reduced reagent consumption, as the results of tests have demonstrated.

It is also claimed, as the result of tests, that the Aerofall mill product facilitates an increase in filtering rates of about 25 percent, due to the lower proportion of slimes.

Figures are not yet available on the following benefit, but it is nevertheless obvious that with the dry-grind, water-control can be rendered more efficient and that water-consumption or -loss can be appreciably reduced.

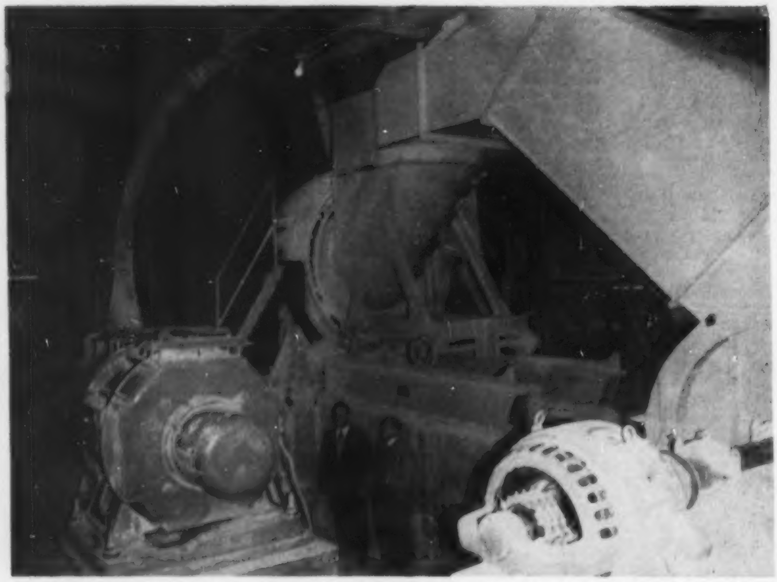
East Daggafontein Mines Ltd.

Through 1953, only current standard equipment was in commission in

Table No. II
Costs in Shillings at Representative South African Gold Mines in 1955

No. of Mines	*Total Tons Milled*	*Tons Per Mine*	*Group-tons Per Month*	*Cost Per Ton*	*Range of Reduction Plant Costs Per Ton*	*Average of previous Col.*
6	4,022,500	670,417	50,000	49.18	5.29—6.78[1]	6.0
9	10,970,000	1,218,888	100,000	39.38	3.66—6.85[1]	5.17
6	11,662,000	1,943,666	150,000	35.63	4.53—6.90[1]	5.42
5	15,144,000	3,028,800	250,000	35.31	4.01—6.15[1]	5.08

1. Over the last full 12 months for which figures are available.



AEROFALL MILL feed end showing details of track-mounted feed hopper. Mill size is shown by men standing beside it. From left they are: D. Weston, chairman, African Aerofall (Pty.) Ltd.; and J. Schoeman, East Dagganfontein mill superintendent.

the East Daggafontein Mines Ltd.'s reduction plant as shown in the flow sheet. Metallurgical operating results in that year were as follows: tons milled–1,104,500; head value–about 3.5 dwt; recovery–93.57 percent; grind–73.6 percent minus-200-mesh.

At the beginning of September 1954, one 17 foot diameter Aerofall mill in closed-circuit with pneumatic cyclones was commissioned. The final product from this circuit was fed into the final pulp from the regular mill section, a procedure that was followed throughout the test period reviewed. In that first month of operation, the circuit handled about 12 percent of the tonnage milled–about 12,000 tons. In the last month of the period reviewed–May 1955–the Aerofall mill circuit handled 25 percent or about 24,000 tons. Through 1954, when the circuit was operated over the final four months, operating results were as follows: tons milled–1,121,000; head value–about 3.4 dwt; recovery–93.846 percent; grind–74.6 percent minus-200-mesh. In the next five months to May 1955, the results were: tons milled–about 470,000; head value–about 3.5 dwt; recovery–95.03 percent; grind–74.5 percent minus-200-mesh. Monthly details are in Table No. V.

Messrs. African Aerofall (Pty.) Ltd. has analyzed the results of operations over the six months from December 1954 to May 1955 on the basis that the Aerofall section or circuit treated about 20 percent of the total tonnage milled and find that the recovery in that period improved to 94.9 percent from the 1954 figure of 93.846. The average head value through the six months mentioned was 3.489 dwt against 3.391 dwt in 1954, and the calculated correction for the difference in these two head values is about 0.2 percent. Assuming the installation of Aerofall mill equipment throughout the plant, the theoretical increase in recovery would be

$$\frac{100}{20} \text{ X } [(94.9-0.2)-93.846]=4.2\%$$

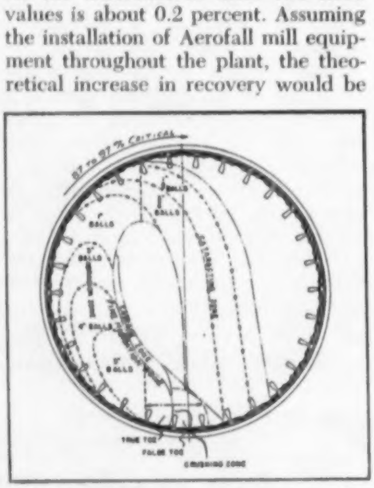
Flow sheets of Aerofall mill equipment with a regrind circuit and of the Aerofall mill equipment only are shown. Comparative data for the existing standard plant and of the two circuits with Aerofall mill equipment, are shown in Table No. VI.

Table No. III

South African Mine Profits and Range of Yields in Shillings in 1955

No. of Mines	*Range of Working Profits Per Ton Milled*	*Range of Yields—Dwt. Per Ton*
19	17.42[1]—0.167—4.33	2.018—4.291
4	5.58—9.33	3.231—4.375
5	11.67—15.75	3.828—4.925
6	24.92—37.33	3.387—8.425
1	43.00	7.472
1	46.42	6.180
1	122.08	15.392

1. Working loss.



ZONAL PATTERN of balls and ore load in an Aerofall mill. Most effective grinding is in abrasion zone and false toe.

Replace Standard Equipment

A logical consequence of the East Daggafontein tests results is the derivation of comparative data reflecting the replacement by Aerofall mill equipment of standard existing equipment handling gold ore only at other mines. To obtain the required data for this comparison, typical Transvaal gold ores were treated in a pilot circuit. Before listing comparative data derived from the tests, the writer presents for further comparison the latest available reduction plant operating costs derived from the reports of certain companies. These costs were on average made up as follows: sorting, crushing and milling–63 to 75 percent; thickening, agitation/leaching, precipitation and dam maintenance–25 to 37 percent. The comparative data derived from the tests is shown in Table No. VII.

In addition to the above benefits, the Aerofall company submits the following metallurgical benefits through the use of its mill equipment. They are: Reduction of cyanide consumption by a minimum of 35 percent. This is a saving of 0.17 Shilling per ton at present 0.5 Shilling average cyanide cost per ton. Increased revenue from improved recovery is 1.5 Shilling per ton based on the 4.0 percent greater recovery on ore assaying 3.0 dwt per ton. Total savings where stamps are shown in Table No. VII is then 4.97 Shilling per ton. And for a standard plant 3.57.

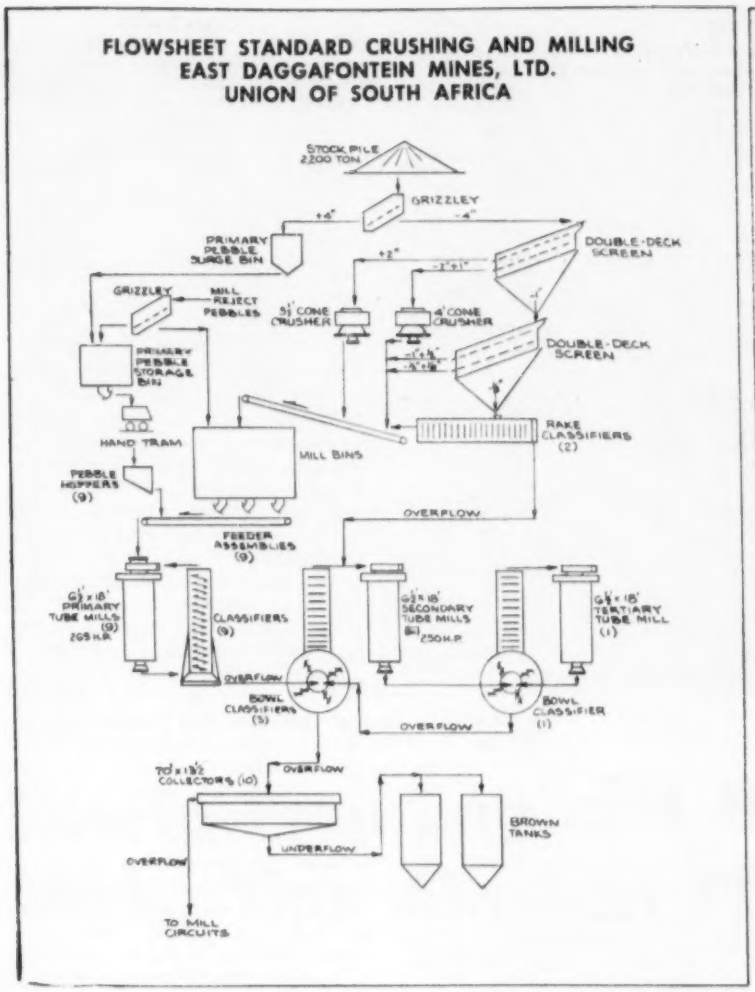
The average overall financial benefits to be derived from the operation of Aerofall mill equipment treating gold ore, as compared with older standard equipment, is therefore shown to be 4.97 Shilling a ton milled, under the conditions described. On this basis, allowing nothing for

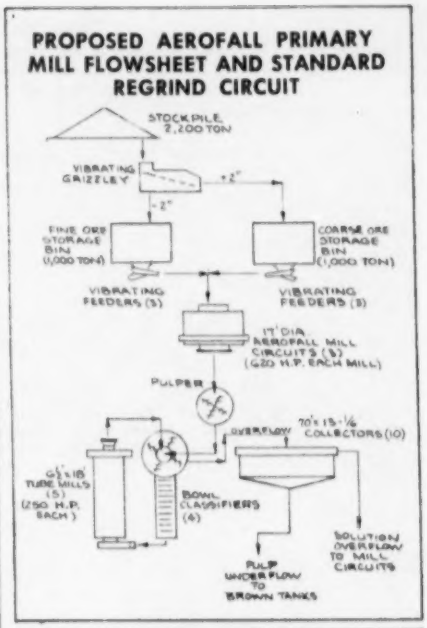
Table No. IV

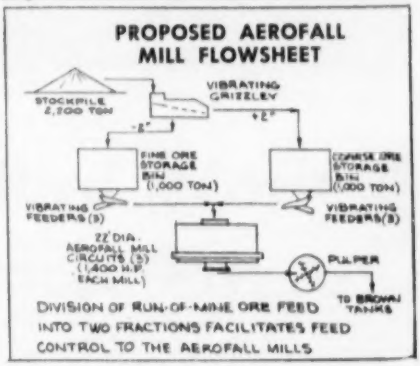
South African Gold-Uranium Producers and Working Profits in Shillings Per Ton in 1955[1]

No. of Mines	*Range of Overall Profits Per Ton*
1	7.10
5	10.08—19.27
1	28.6
3	31.46—39.90
3	42.43—58.09
2	103.97—131.64

1. Five of these 15 mines returned gold losses, but four of these five reported overall profits.




PROPOSED AEROFALL PRIMARY MILL FLOWSHEET AND STANDARD REGRIND CIRCUIT
STOCKPILE 2,200 TON
VIBRATING GRIZZLEY
+2"
-2"
FINE ORE STORAGE BIN (1,000 TON)
COARSE ORE STORAGE BIN (1,000 TON)
VIBRATING FEEDERS (3)
VIBRATING FEEDERS (3)
17' DIA. AEROFALL MILL CIRCUITS (5) (620 H.P. EACH MILL)
PULPER
OVERFLOW
70' x 13'-1½" COLLECTORS (10)
6½' x 18' TUBE MILLS (5) (250 H.P. EACH)
BOWL CLASSIFIERS (4)
SOLUTION OVERFLOW TO MILL CIRCUITS
PULP UNDERFLOW TO BROWN TANKS


PROPOSED AEROFALL MILL FLOWSHEET
STOCKPILE 2,200 TON
VIBRATING GRIZZLEY
-2"
+2"
FINE ORE STORAGE BIN (1,000 TON)
COARSE ORE STORAGE BIN (1,000 TON)
VIBRATING FEEDERS (3)
VIBRATING FEEDERS (3)
22' DIA. AEROFALL MILL CIRCUITS (5) (1,400 H.P. EACH MILL)
PULPER
TO BROWN TANKS
DIVISION OF RUN-OF-MINE ORE FEED INTO TWO FRACTIONS FACILITATES FEED CONTROL TO THE AEROFALL MILLS

the reclaim value of standard equipment in a 100,000 ton-a-month plant; £340,000 for new Aerofall equipment to be used with part of the secondary grinding circuit and of the thickening equipment; the amortization or write-off period for the new capital outlay, excluding provision for taxation, is about 14 months. Under similar basic conditions, the new capital outlay in a 250,000 ton-a-month plant is estimated at £781,000, and the amortization period about 13 months. All the above estimates are in respect of gold output only.

Costs of Primary Installations

Under this heading, two examples have been considered by the Aerofall company: the first applies to a 140,000 ton-a-month plant with an initial treatment rate of 50,000 tons-a-month; the second to a 100,000 ton-a-month plant, with the same initial treatment rate. The comparison is in respect to current standard equipment on the one hand, and Aerofall equipment throughout on the other hand and is shown in Table No. VIII.

Uranium Extraction

The operating costs of uranium extraction are known to be relatively high. Accordingly, in addition to the

Table No. V

Assay Mill Feed and Percent Gold Recovery by Months in 1954 and 1955 at East Daggafontein Mines Ltd.

Month	*Head Assay Per Ton in Dwt.*	*Percent Recovery*
July 1954	3.558	93.71
August	3.392	93.75
Aerofall Circuit Commissioned		
September	3.339	93.84
October	3.413	94.07
November	3.122	93.29
December	3.285	94.25
January 1955	3.707	94.95
February	3.579	94.99
March	3.501	94.99
April	3.507	95.38
May	3.356	94.84

Table No. VI

Comparative Data Between Standard Plant, Aerofall Mill With Standard Regrind Circuit, and Aerofall Mill Equipment Only at East Daggafontein Mines Ltd.

Item	*Standard Plant*	*Aerofall Mill With Standard Regrind Circuit*	*Aerofall Mill Equipment Only*
Total installed horsepower	6,058	5,280	5,940
No. of motors	87	29	17
No. of pumping stages	11	3	2
No. of pumps	26	6	3
No. of conveyor stages	15	3	3
Length of conveyors—feet	5,081	960	1,035
No. of operational and maintenance manshifts per day—European	17	8	6
Native man shifts	114	35	25
No. major machines	32	8	5
No. minor machines	34	14	12
Capacity in tons per 24 hours	3,600	4,400	4,000
Grind in percent minus-200-mesh	74	80	70

Table No. VII

Comparative Costs and Savings in Shillings Per Ton For Various Sizes of Gold Mills Using Different Types of Grinding and Crushng Equipment in the Union of South Africa

Tons Per Month	Average Cost	Crushing and Milling	Basic Costs			Savings With Aerofall Equipment		
			Stamps	Standard	Aerofall	Crushing Milling	Stamps	Standard
50,000	6.00	4.21	—	—	—	3.01	—	—
100,000	5.17	3.47	4.50[1]	3.10[2]	1.20[3]	2.27	3.30	1.90
150,000	5.42	3.64	—	—	—	2.44	—	—
200,000	5.08	3.41	—	—	—	2.21	—	—

1. Crushing and milling costs per ton in a plant incorporating stamps; grind—80% minus-200-mesh.
2. Crushing and milling costs per ton in a modern standard plant; grind—80% minus-200-mesh.
3. Milling costs per ton in an Aerofall plant—100,000 tons per month; grind—80% minus-200-mesh. An average of 31 percent is allowed for thickening, agitation/leaching, precipitation, and dam maintenance. The grind of 80 percent minus-200-mesh is somewhat finer (about 5 to 10 percent) than that reflected by the costs under crushing and milling.

Table No. VIII

Cost Comparisons For Standard and Aerofall Milling Plants With Initial Capacities of 50,000 Tons Monthly, and For Extensions to 100,000 and 140,000 Tons Monthly

Item	Initial Costs 50,000 Tons Per Month Plants		Costs Of Extensions To 140,000 Tons	
	Standard Plant	Aerofall Plant	Standard Plant	Aerofall Plant
Stockpile	£ 75,000[1]	£ 75,000[1]	—	—
Sorting and Crushing	320,000	60,000[2]	—	—
Milling	270,000	545,000	£487,000	£128,000
Thickening	70,000	—	100,000	38,000[3]
Totals	£735,000	£680,000	£587,000	£166,000

Totals for standard plants: £1,322,000
Total for Aerofall plants: £846,000

	Initial Costs 50,000 Tons		Costs Of Extension To 100,000 Tons	
	Standard	Aerofall	Standard	Aerofall
Stockpile	£ 60,000[4]	£ 60,000[4]	—	—
Sorting and Crushing	290,000	50,000[2]	—	—
Milling	270,000	340,000	225,000	64,000
Thickening	70,000	—	25,000	32,000[3]
Totals	£690,000	£450,000	£250,000	£ 96,000

Total for standard plants: £940,000
Total for Aerofall plants: £546,000

1. 5,000 tons. 2. Sorting plant only. 3. Obviously, in the case of such a dry-grinding unit as the Aerofall mill, the final product can be pulped to any required density for the agitation and extraction processes. Thickeners are accordingly not required normally. However, the above provision has been made where a wet-grinding regrind unit is specified, or may be required. 4. 2,000 tons.

benefits to be derived from Aerofall equipment in the process of reduction, there are the metallurgical considerations of recovery of uranium oxide and the consumption of reagents. The indicated benefits in the process of reduction have already been described; and mention has already been made of the high degree of mineral liberation and/or selective grinding in the Aerofall closed circuit. To obtain data on the metallurgical

Table No. IX

Comparison of Standard Plant and Aerofall Plant Treating Uranium Ore Including Grind, Distribution of Uranium, Recovery and Sulphuric Acid Consumption

Item	Standard[1]	Aerofall[2]
Percent minus-200-mesh	79.2	60.4
Percent Distribution of values in minus-200-mesh fraction	86.0	78.6
Percent recovery	79.0	88.5
Sulphuric acid consumption in pounds per ton of ore	18.0	11.7[3]

1. Three-stage crushing, primary rod mill, secondary and tertiary pebble mills.
2. Run-of-mine to final grind in a single pass or stage.
3. This is a 35 percent reduction in consumption.

considerations mentioned, a South African mining company took bulk samples—on the one hand from an operating plant incorporating standard equipment, and on the other from an Aerofall circuit. These samples were separately treated in the same circuit and under identical conditions. The results are given in Table No. IX.

The uranium tests disclosed certain points of considerable interest. For instance, the improvement in recovery, namely 9.5 percent, was achieved despite the coarser grind of the Aerofall circuit product. This indicated that there had been a satisfactory liberation of mineral from gangue and/or that there had been achieved a satisfactory measure of selective grinding of the mineral constituents at the grind of 60.4 percent minus-200-mesh without the formation of an undue, impeding proportion of gangue slime. This in part arises from the sharper or finer "cut" possible with pneumatic classifiers, compared with that in hydraulic classifiers. The relatively more sluggish "cut" in the latter probably tends towards excessive overgrinding of mineral constituents with the possible formation of colloidal or semi-colloidal particles as well as of excessive gangue slime, particularly at

Continued on page 77

Table No. X

Operating Data on Orange Free State Gold-Uranium Ores With Primary Grinding In Aerofall Mills of 22-, 25-, and 28-foot Diameters on Run-of-Mine Ores. Secondary Grinding in Slow Speed Ball Mills. Both Stages of Grinding With Cyclonic Classifications

Item	AEROFALL MILL DIAMETERS														
	22-Feet	25-Feet	28-Feet	22-Feet	25-Feet	28-Feet	22-Feet	25-Feet	28-Feet	22-Feet	25-Feet	28-Feet	22-Feet	25-Feet	28-Feet
Tons per month[1]	70,000	117,000	150,000	57,000	94,000	120,000	47,000	75000	96,000	38,000	62,000	78,000	30,000	50,000	62,000
Number primary mills	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Percent minus-200-mesh in primary circuit	30	30	30	40	40	40	50	50	50	60	60	60	70	70	70
Percent minus-200-mesh[2] in secondary circuit	60	60	60	60	60	00	60	60	60	70	70	70	80	80	80
Horsepower, secondary	540	900	1,160	300	480	610	120	200	250	100	160	200	75	125	160
Total steel consumption in pounds per ton	0.92	0.92	0.92	0.66	0.66	0.66	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Percent minus-200-mesh in secondary circuit[3]	70	70	70	70	70	70	70	70	70	80	80	80	85	85	85
Horsepower, scondary	720	1,200	1,550	440	720	920	240	400	500	200	320	400	115	190	240
Total steel consumption in pounds per ton	1.30	1.30	1.30	0.98	0.98	0.98	0.65	0.65	0.65	0.56	0.65	0.65	0.48	0.48	0.48
Percent minus-200-mesh in secondary circuit[4]	80	80	80	80	80	80	80	80	80	85	85	85	—	—	—
Horsepower, secondary	900	1,500	1,940	590	960	1,230	360	600	750	250	400	500	—	—	—
Total steel consumption in pounds per ton	1.68	1.68	1.68	1.30	1.30	1.30	0.98	0.98	0.98	0.81	0.81	0.81	—	—	—

1. For 26 operating days at 95 percent operating time.
2. Percent of current thickener capacity-30. 3. 40 percent. 4. 50 percent. 5. 24 percent. 6. 33.3 percent—7. 12 percent.

OVER-ALL VIEW showing initial pit. Dragline is scraping pay gravel to be placed in elevated sluice-box hopper directly behind. Note bulldozer in background pushing gravel tailings back into worked-out area.

Sound Planning and Hard Work Make This Alaskan Placer Pay

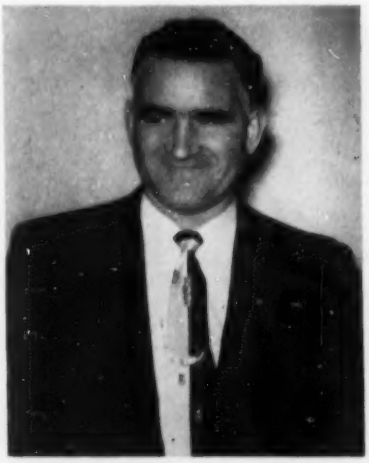
By HENRY G. GRUNDSTEDT
Manager, Engineering Services
Mining World

Alaska gold mining, a declining business since World War II and subsequent inflation, is nonetheless still playing an important part in the economy of many sections of the Territory.

Surprising to some is the fact that much of the diminution of this formerly flourishing industry is not attributable to the narrowing gap between today's cost and $35.00 gold, but rather to the miner's difficulties in obtaining adequate financing following the inactive years during the war—financing that takes into consideration the thawing, stripping, and ground preparation that must be kept well ahead of actual mining operations conducted during the extremely short season. Too, this problem of financing bears heavily upon the factor of equipment amortization and taxes as well, because equipment customarily written off in a five-year period in most areas is put to use in Alaska for only 15 months—a bare three months of each of the five years.

An example of good conduct of a placer operation is found near Ruby, Alaska, where the Miscovich brothers, John and George, are operating their property in the Poorman district, about 66 miles south of Ruby.

The Miscovich operation's primary



JOHN MISCOVICH, along with brother, owns and successfully operates the placer at Poorman Creek, Alaska.

elements comprise stripping, excavating, sluicing, pumping, and hydraulic monitoring equipment combined to handle a profitable yardage in the short three month season, and keeps stripping and thawing ahead for future years. A team of Caterpillar D-8's, a 1½-yard Lima dragline feeding the sluices, and a Chiksan "intelli-Giant" along with manually operated giants, are the main players in the performance.

Bulk mining supplies and equipment, as well as fuel and lubricants, are transported down the Yukon River from Nenana to Ruby. These supplies are subsequently picked up by the mine operators for delivery to the property. The road from Ruby to Poorman is at best a poor tractor road, and for this reason all bulk freight is hauled during the winter months. The method of transport would be unique to mine operators in warmer climes—"Go-Devil" sleds hauled by two Caterpillar D-8 crawlers doing the job.

Leaving camp, the procession starts for town with a snowplow-equipped D-8 blazing the road. Another D-8 follows behind towing the sleds. The

DRAGLINE DUMPING PAY GRAVEL INTO SLUICE-BOX HOPPER. The gravel is washed over a set of Hungarian-type riffles, modified by the Miscovich brothers. Recovery using this type riffle in an elevated sluice has been excellent.

initial trip takes about six days—six days to travel the 66 miles! The return trip finds each tractor pulling a full sled-load of freight. To haul just a season's requirements of 650 drums of fuel and lubricants involves four round trips alone. These and other supply items are usually ordered a year in advance.

Under these conditions, careful advance planning is necessary to handle the supply problem successfully. Due to the extremely short operating season, "dead work" must be done during the off-seasons in early winter or spring.

An air-strip at the camp provides facilities for weekly plane service. Camp supplies, food, mail and other items are all transported in this manner. Due to these expensive transportation methods, supply costs for some items are increased four-fold.

Tough Operating Conditions

Conditions for operation at Poorman are anything but ideal. The difficult transportation setup, the short mining season, and permafrost combine to make even the most hardy miner think twice before starting another season.

Preparation work for the mining now underway at Poorman took seven seasons, or, if you will, seven years. To most mining operations this means the work that could be done in 21 months. Considerable of this development time was occupied by the digging of a water ditch connecting adjacent creeks with the mine. The ditch is 16 miles long and approximately a 300-square-mile area drains into it. Constructed on a ⅜ percent grade, and dug through permafrost, it took over two seasons to complete. Water carried through the ditch is used to supply the hydraulic giants for the stripping and mining operation.

Balance of the preparation work ahead of mining consisted of the stripping operation. A 60- to 80-foot layer of permafrost had to be removed before the pay gravel was exposed. Stripping was accomplished by a D-8 Caterpillar tractor equipped with an Issacson hydraulic ripper, a Chiksan Intelli-Giant, and several manually operated giants. Permafrost was ripped in a criss-cross fashion, broken-up ground then being sluiced away with the giants.

Determining Reserves

Because of the nature of the stream beds and contained gravels, reasonably accurate gravel reserves can be calculated by means of a systematic drilling and sampling program. Drill holes are laid out in rectangular pattern. Preliminary holes are placed 100 feet apart across the creek, and 500 feet apart along the course of the stream. Detailed drilling is done later on, between the former holes.

A 6-inch Kirk-Hillman churn drill is used for all test drilling. When the drill strikes pay gravel, samples of the sludge are taken every six inches. Samples are then panned and weighed. Pay gravel, in the creek at Poorman, has been found to extend approximately 300 feet wide. Gravel thickness usually ranges from 20 to 22 feet thick, the highest gold concentration being in the bottom six feet, lying on a bedrock of fractured schist. Gold size varies from plus-100-mesh, to nuggets weighing three to four ounces.

Mining Procedures

Mining is done by excavating blocks of gravel in the stream approximately 200 feet wide, 300 feet long, and 20 feet thick. The present capacity of the Poorman operation is usually limited to two of these blocks per operating season. Equipment used is a 1½-yard Lima dragline with 60-foot boom, two D-8 Caterpillar bulldozers, and three hydraulic giants.

Inadequate drainage complicates the mining problem. Pay gravel is located below the surface drainage level, and bedrock lies approximately 22 feet below this drainage level. This unusual problem is solved by digging an initial pit, which is as wide as the gravel block to be removed, bottoms 30 feet below the surface drainage

CLOSE-UP VIEW OF ELEVATED SLUICE-BOX, showing 4-inch jets in feed hopper. These powerful jets project over 5,000 gpm, and can wash up to ¾-yard boulders over the riffles. Dragline in background is readying load of pay gravel for sluice.

level. Surface drainage has a grade of 1½ percent. Situated at the bottom of the pit are a hydraulic lift, or syphon, and a Fairbanks-Morse solids handling pump.

After excavation of the initial pit, actual mining operations are started. A manually operated giant was installed at one side of the cut above the pit. Pay gravel is hydraulicked upstream from monitor towards a stockpile. Two D-8 bulldozers move gravel toward the water jet from the monitor, and, in turn, to the stockpile. Approximately 2,000 gpm of water, pumped through the giant's 3-inch nozzle, is played on the clay-gravel with a pressure of 50 psi. This pressure is sufficient to free the gold in the gravel. The process of hydraulicking the clay-gravel upstream, besides moving the gravel, is actually a desliming operation.

VIEW SHOWING INITIAL PIT. Excavation of this pit at the head of proposed cut is first step in mining operation. As pay gravel is below surface drainage level, slurries from hydraulicking flow into pit, and are pumped to drainage level.

Desliming Operation

The free gold is held in a tightly packed clay, or "gumbo," cementing the gravel together. Slimes formed by breaking up the gravel flow downstream into the initial pit. The hydraulic lift and solids handling pump, pump the slime solution out of the pit. Approximately 4,000 gpm are handled by the pump which is powered by a 130-hp Murphy Diesel engine. Once the slime solution is out of the pit, it flows on downstream on the normal drainage level. This is actually a desliming process, completed before the pay gravel reaches the recovery plant.

As can be seen, the two reasons for this pre-recovery desliming process are:

1. To decrease the yardage the dragline has to handle later in the operation.
2. To break up the clay, thereby freeing the gold.

By desliming in this manner, roughly 60 percent less yardage has to be handled by the recovery plant, truly a cost-cutting step. Gold loss in the slimes is negligible.

Recovery Plant

After desliming, the clean gravel is fed by the dragline to the hopper at the head of an elevated sluice box. Dimensions of the hopper are 20 feet long, 10 feet wide, with sides four feet high. The sides of the steel hopper slope toward the riffles in the sluice box. The 5-percent grade on the bottom of the hopper aids the flow of gravel towards the riffles. The sluice itself has a drop of 16 inches every 10 feet, and is 80 feet long. Four 4-inch jets in the sluice hopper help wash the gravel over the riffles, providing wash water to the gravel at a rate of approximately 5,000 gpm. The force is sufficient to wash boulders as large as ¾-yard in size over the riffles.

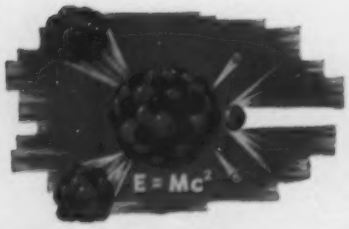
The riffles are an adaptation by the Miscovich brothers of the Hungarian type. Laid parallel across the sluice box, they measure 36 inches in length. They are constructed of ¼- and ⅜-inch steel plate, and stand up very well. In cross section, the riffles have the shape of an inverted obtuse angle, the leading edge slanted with the direction of flow. Tests conducted by the operators have shown this type of riffle to effect a better recovery than more conventional types. Also, a considerable increase in efficiency of the riffles was noted as a result of the initial desliming process.

Gravel, which has passed through the recovery plant and drained, is then moved by bulldozer to fill in mined out areas. However, before the exposed bedrock in the mined areas is covered, it is carefully inspected. Small pockets of high grade gold are occasionally found in cracks and fissures in the schist bedrock. These pockets are dug out manually. Such occurrences are not infrequent; although not counted on beforehand, they offer a welcome bonus.

During the fall of the year, stripping operations are started again. An Alaska placer operator will strip as far ahead as weather and finances allow. The early winter and resulting freeze then shuts the operation down until the following summer season.

The general public does not hear too much today of Alaska's gold industry, but it still exists and plays an important part in the life of numerous communities. Operations such as the Miscovich brothers' Poorman Creek placer do much to bolster the economy and development of Alaska with its far flung regions.

AERIAL VIEW showing campsite at Poorman Creek placer. Note water ditch at top of picture. This ditch, supplying water for the hydraulic mining operation, is 16 miles long, and took two seasons to complete. Open cut is shown in foreground.



FISSION FACTS

Monthly Roundup of Mining News In the Atomic Energy Field

British AEC To Buy U_3O_8 From Australian Deposit

The British Atomic Energy Commission will sign a contract to buy more than £40,000,000 worth of uranium from the Mary Kathleen mine between Cloncurry and Mount Isa, Queensland, Australia. A £10,000,000 treatment plant will be built and is expected to be in operation by 1959. The Australian government, in consenting to the agreement, reserved the right to acquire for defense purposes any part of the uranium produced during the period of the contract. The government has stipulated, and the parties have agreed, that a certain tonnage of outside ores will be treated at the Mary Kathleen plant if practicable.

Rio Tinto Ltd. will provide about £2,250,000 and remaining money will come from other sources. The shareholdings in Mary Kathleen Uranium Mines Ltd. have been altered slightly. Australasian Oil Exploration Ltd. which had a 39 percent interest, will now have 35 percent; the original discoverers will have nine percent, instead of 10; and Rio Tinto (Australia) Pty. Ltd. (formed in March 1955) will have the remaining 56 percent, instead of the original 51 percent.

Reserves are believed to exceed 3,000,000 tons of ore above 0.2 percent U_3O_8 in grade. The deposit will be worked by open pit, and should be the world's second largest uranium open-pit operation. First is the Anaconda Company's Jackpile mines in New Mexico.

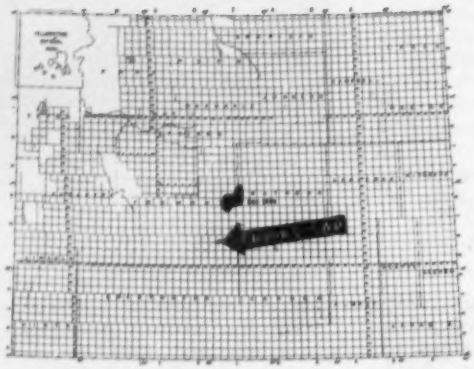
Among the projects to be undertaken in connection with the development are: construction of a townsite for 1,000 people; a 3,500,000-gallon reservoir, capable of withstanding a three-year drought; a power station; a crushing mill and treatment plant.

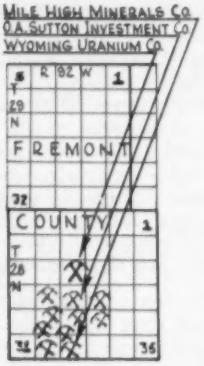
Federal Uranium Forms Utah Operating Company

Federal Uranium Corporation has formed a new company, Radorock Resources, Inc., which will receive all of Federal's interest in the Radon and Hot Rock claims in the Big Indian mining district of San Juan County, Utah. Both properties are operated by Hecla Mining Company of Kellogg, Idaho. Federal will distribute 50 percent of Radorock shares to Federal stockholders, and will retain the other 50 percent as investment.

To January 31 of this year, the Radon group is reported to have produced about 5,000 tons of uranium ore, and current production is said to be about 400 tons per day. The Hot Rock claims, which are adjacent to the Radon property, are being drilled.

Phelps Dodge Drills Crooks Gap U_3O_8





Phelps Dodge Corporation was completing final negotiations in mid-April necessary for formal contract signing of its purchase option on the uranium claims of Mile High Minerals Company in the Crooks Gap district in central Wyoming. The map (above at left), shows the location of the Crooks Gap district. While the final details were being worked out by lawyers of the two companies, exploration drilling crews were moving on to the Mile High's Trey claims. It was on these claims that Mile High found several zones of ore-grade uranium mineralization by deep drilling last year. In fact, several samples were high grade, and the primary uranium mineral, coffenite, has been identified from cores taken 800 feet below the surface.

Phelps Dodge is moving in churn drills to further prospect the area under terms of the agreement. It is planned to drill some holes to a depth of 1,000 feet. Nine-inch casing will be set in these deep holes. Under the terms of the option, initial cash was called for. This option expires October 1, 1956. If the option is then exercised a further payment will be made. As Phelps Dodge expends more money on the property, it will acquire additional ownership in Mile High until it owns 51 percent.

Phelps Dodge has established a field camp at the claims in charge of Eldon Clark who will supervise drilling, with Ray Luddin in charge of the geological work.

The location of the 21 claims in the Trey group is shown in the map at top right. Also shown are the claim locations of the Harrower Exploration Company. The O. A. Sutton Investment Company of Wichita, Kansas recently secured a $1,000,000 purchase option with a 10 percent overriding royalty for 48 claims. The Sutton firm has secured drilling and purchase options on a number of other claims in the area. The Sutton group has a one-year option for prospect drilling. The Harrower interests already have drilled a few holes on the claims and found some ore grade mineralization. However, more drilling is necessary to determine the extent and grade of this mineralization.

Many of the Crooks Gap claims were staked early in the winter of 1954 following the Gas Hills discoveries to the northeast. In 1955 the United States Atomic Energy Commission conducted a core drilling program in the district in an attempt to resolve some of the geological problems of the complex regional structure and to determine the nature and factors which might have localized mineralization. Six of 10 wildcat holes drilled on one-fourth to two-mile centers hit ore grade mineralization. In one hole a zone cut 470 feet deep showed seven feet of 0.37 percent U_3O_8. Another hole cut three feet of 0.78 percent U_3O_8 at a 245-foot depth. Mineralization is apparently confined to the Wasatch formation with uranium cencentrations where there is a combination of carbonaceous siltstones and arkosic sandstones with suitable structure.

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Gold Claims Reach $120,955,190 As 189 Cases Filed With Court

The United States Court of Appeals' decision on February 20, 1956 that western gold miners are entitled to be paid just compensation for taking their gold mining properties under World War II WPB limitation order L-208 was fully outlined in the April issue of MINING WORLD, page 54.

Cases Delayed By Justice Dept.

Following the decision the Department of Justice made a routine motion for a new trial. The best qualified lawyers in Washington, D. C. believe that the motion will be summarily rejected. However, this delaying action on the part of the government holds up further action on the cases because the motion must be ruled on before the start of the 90-day period in which the Petition for a Writ of Certiorari can be made to the Supreme Court. It now appears that it will be the first of 1957, at the earliest, before there is a final determination of the present test group of cases.

Who Are The Claimants?

As a further service to the mining industry, MINING WORLD has been able to obtain a most authentic list of actual claimants who had, at the time of the decision, actually filed damage claims with the Court. As the list was compiled directly from Court records, it should be the best list now available. Court records showed the following for each claimant: docket number; who filed the claim, be it a company, corporation, individual, trustee, etc.; and amount claimed. To make the list more useable, MINING WORLD has listed, by states when known, where the gold producing operations were and/or are located, whereas in many instances Court records indicate the head office of the claimant. Also one company can file for several operations in various states. This geographical listing is probably not 100 percent accurate, and not complete, because many claimants whose operations could not be determined have been listed in a general "miscellaneous" heading.

Not surprising is that California heads the list of known claimants with 55 out of a total of 180 filing. The largest individual claim is for $11,900,000.00 by the United States Smelting, Refining and Mining Company. Other large claims were filed by Homestake Mining Company, $10,777,448.01; Empire Star Mines Co., Ltd., $5,386,822.02; and Idaho Maryland Mines Corporation, $5,021,799.00. A group of trustees of the creditors and stockholders of the California-Hidden Treasure Mines Company and North America Mining Company have filed claims totaling $25,000,000.

Smallest claims were filed by Alma Lincoln Mining Company, $4,695.51; Nora E. Watt, $8,000; and Albert Saari, $8,667.

Claims Figures Set High

Total claims amount to $120,955,190.52. It is obvious that some claimants have set unreasonably high damage figures and that, when the determination of actual and true damages are made, many claims will be scaled down, and perhaps others not allowed.

Obviously those companies which maintained a very complete record of all operations and costs will be able to do the best job in presenting their cases in arriving at damages. In this connection, the large number of gold dredging firms would seem to have an advantage. It is tragic that such a large number of such claimants have never been able to resume operations because of their forced shutdowns.

ALASKA

Claimants include: 49693, Alaska-Pacific Consolidated Mining Co., $209,719.61; 189-53, Hirst Chichagof Mining Co. $412,500.00; 272-53, Brinker-Johnson Co., $246,000.00; 289-53, Nabesna Mining Corporation, $274,348.00; 340-53, (1) Glenn Carrington, L. C. Thomson, (3) E. B. Klunkrohn, (4) W. E. Dunkle, (5) A. F. Erickson, and (6) L. R. Roebke, copartners under the firm name and style of Caribou Mines, $140,000.00; 342-53, Gold Bullion, Inc. $289,949.13; U. S. Smelting, Refining and Mining Co., $11,900,000.00; 356-53 Alluvial Golls, Inc., $109,775.62; 357-53, Gold Placers, Inc., $94,072.89; 360-53, Hattie Esther Quigley individually, and as special administratrix of the estate of Edwin Walter Quigley, deceased, $50,000.00; 361-53, Harvey L. Sorensen, $536,952.72; 378-53, Dan Creek Placer Mines, Inc., $42,500.00; 413-53, Cleary Hill Mines Company, $296,463.28; 443-53, Middle Fork Mining Company, $321,278.00; 445-53, Archie W. Pringle, $70,000.00.

ARIZONA

A claim in Arizona is 416-53, Sidney J. Kagan, as trustee in bankruptcy of the estate of Arizona Eastern Gold Mines Co., and Oliver A. Wyman, $1,447,310.00.

CALIFORNIA

California cases are: 49468, Central Eureka Mining Company, $1,256,694.26; 49486, Oro Fino Consolidated Mines, Inc., $72,584.38; 50182, Idaho Maryland Mines Corp., $5,021,799.00; 50214, Alabama-California Gold Mines Co., $220,000.00; 223-53, Kern Development Co., and Kern Mines, Inc., $245,886.13; 238-53, Alice E. Burton, Clifford G. Burton, Dorene M. Settle, Leona V. Graham and Vivian L. Dixon, d/b/a Burton Bros., a co-partnership, $1,400,000.00; 258-53, Anglo American Mining Corp., Ltd., $862,095.32; 274-53, Natomas Company, $1,319,130.00; 275-53, Consumnes Gold Dredging Co., $382,221.18; 306-53, Effie M. Tower individually and as executrix under the last will and testament of Frank S. Tower, $64,166.56; 308-53, LaGrange Gold Dredging Co., $525,000.00; 310-53, Empire Star Mines Co., Ltd., $5,386,822.02; 311-53, San Joaquin Mining Co., $845,000.00; 312-53, Merced Dredging Co., $365,000.00; 319-53, Klamath Dredging Co. & Guy M. Standifer, L. A. Glover (as trustee), Marguerite B. Standifer, Guy M. Standifer (as trustee) & Andres Soriano, d/b/a Klamath Dredging Co., a ltd. partnership, $1,143,091.30; 345-53, Gold Hill Dredging Co., $57,647.12, $72,375.00; 349-53, Volo Mining Co., Inc., $73,455.60; 353-53, Capital Dredging Company, $544,000.00; 355-53, Yuba Consolidated Gold Fields, $1,750,000.00; 367-53, Roaring River Dredging Corp., a California Corp., $160,000.00, $25,000.00; 368-53, (1) Roseville Gold Dredging Co., and (2) Strap Ravine Dredging Corp., $450,000.00, $15,000.00, $180,000.00; 369-53, (1) Frank P. Adams; (2) J. F. Adams; (3) C. H. Carruthers; (4) Agnes M. Cleaveland; (5) A. Crawford Greene; (6) Wendell C. Hammon and (7) Lola Lee Hammon, his wife; (8) Phyllis W. MacDonald; (9) M. Pierce Milton, Executor of the Estate of Maxwell C. Milton, deceased; (10) C. C. Peters; (11) Roaring River Dredging Corp.; (12) Edna Shenton; and (13) F. F. Thomas, Jr., $120,000.00, $15,000.00, $600,000.00, $195,000.00; 383-53, California Aztec Mining Co., $382,248.82; 385-53, Standard Hill Mines Co., $78,000.00; 393-53, Cactus Mines Co., and C. W. Six, as liquidating Trustee for Cactus Mines Co., a dissolved California corp., $230,196.61; 396-53, Thurman & Wright, Limited Partnership, $353,138.79; 397-53, Thurman Gold Dredging Co., $134,189.02; 398-53, Snelling Gold Dredging Co., $253,179.59; 409-53, A. F. Giddings, W. H. Haines & O. Jack Boucher, co-partners d/b/a General Dredging Co., a partnership, $138,554.15; 415-53, Belden Amador Mines, Inc., and Belama Corp., $75,000.00, $81,377.92; 421-53, J. W. Hoefling, A. M. Hoefling, P. M. Hoefling and Surcease Mining Co., $652,346.21; 422-53, Yreka Gold Dredging Co., Inc. and Arrovo Seco Gold Dredging Co., Inc., $49,072.28; 426-53, Calaveras Central Gold Mining Co., $1,578,000.00; 427-53, Alhambra-Shumway Mines, Inc., $241,000.00; 428-53, Barker Corporation, Inc. & Explorers, Inc., $190,347.94; 429-53, Irene L. Best & The Best Mines Co., Inc. $651,783.38; 435-53, C & F Dredging Co., $83,000.00; 454-53, Jens S. Larsen, Jens P. Harms, and Helge C. Harms, in his own behalf and as Executor of the Estate of Jacob C. Larsen, deceased, $31,002.04; 457-53, Lloyd S. Ackerman, Lionel T. Barneson, James D. Dole, Harry C. Hunt, Etheredge Walker, J. E. Croudace, on their behalf and on behalf of other former stockholders of the French Gulch Dredging Co., $15,658.72; 237-53, The First National Trust & Savings Bank of

San Diego, as trustee, John C., Otto G. and Effie M. Geringer, Marie Layer, Julia Lukes and Emily Geringer, $425,000.00; 303-53, Sacramento Gold Mining Co., $218,308.45; 369-53, (1) Frank P. Adams; (2) J. F. Adams; (3) C. H. Carruthers; (4) Agnes M. Cleaveland; (5) A. Crawford Greene; (6) Wendell C. Hammon and (7) Lola Lee Hammon, his wife; (8) Phyllis W. MacDonald. (9) M. Pierce Milton, Executor of the Estate of Maxwell C. Milton, deceased; (10) C. C. Peters; (11) Roaring River Dredging Corp., a Cal. corp.; (12) Edna Shenton; and (13) F. F. Thomas, Jr., $120,000.00 $15,000.00, $600,000.00, $195,000.00; 381-53, (1) Louise Becker (2) Cora M. Durfey (3) Herbert Hopkins and (4) Wishon-Watson Company, a Calif. corp., $1,000,000.00, $30,000.00, $330,000.00; 405-53, Spring Hill Corporation, $900,000.00; 447-53, Peter L. Reader, d/b/a North Fork Dredging Co., $70,520.10.

COLORADO

In Colorado cases are: 115-53, W. R. Wade, $1,039,785.32; 267-53, South Platte Dredging Co., $224,320.00; 325-53, The Empire Lee Mining Co., $17,541.10; 326-53, The Cresson Consolidated Gold Mining & Milling Co., $284,456.87; 327-53, The Golden Cycle Corp., $2,044,259.27; 328-53, The United Gold Mines Co., $173,295.34; 329-53, The Jerry Johnson Gold Mining Co., $11,190.44; 366-53, Treasure Mountain Gold Mining Co., $341,884.69; 371-53, Clare Shove, Mabel N. Scott and George S. Groves, as Trustees of the Creditors and Stockholders of (1) California-Hidden Treasure Mines Co., a dissolved corp. of the State of Colorado, (2) American Mining Co., (3) American Mining Co. (formerly named American Uranium and Gold Corporation), (4) Gold Uranium Corporation and (5) Gold Uranium Mining Co., $15,000,000.00; 372-53, (1) Mabel N. Scott, (2) Clare Shove and (3) George S. Groves, as Trustees of the Creditors and Stockholders of North American Mining Co., a dissolved corp. of the State of Colo., Gold Uranium Corp. and Gold Uranium Mining Co., $10,000,000.00; 411-53, The Stratton Cripple Creek Mining and Development Co., $562,277.98; 424-53, William S. Rush, Walter Burleson, & Harold R. Koster, on their own behalf and on behalf of other former stockholders of the Burleson Mines Inc., a defunct corporation, $250,000.00; 430-53, John Deerksen, trustee, and Front Range Mines, Inc., $161,209.52; 456-53 LeRoy Giles & Co., Inc., $19,805.85; 453-53, Paul Nardin, $85,000.00; 456-53, Alma Lincoln Mining Co., $4,695.51.

IDAHO

Idaho mines with claims are: 265-53, Baumhoff-Marshall, Inc., $1,056,542.23; 314-53, Salmon River Mines Co., $232,174.91; 315-53, Idaho-Canadian Dredging Co., $1,230,350.39; 316-53, Idaho-Canadian Dredging Co. & Sunshine Mining Co. d/b/a Burnt River Division —Sunshine Mining Co., $281,869.15; 317-53, Idaho-Canadian Dredging Co. & Sunshine Mining Co. & The Lehman Corp. d/b/a Fairview Placers, $553,709.40; 335-53, Idaho-Canadian Dredging Co. & Warren Dredging Corp. d/b/a a Mining Partnership under the name, style and firm of Idaho-Warren Dredging Co., $145,935.77; 336-53, Warren Dredging Corp. $620,507-03; 375-53, Talache Mines, Inc., a corp., $742,182.37.

MONTANA

Claims include: 50214, Ermont Mines, Inc., $175,000.00; 376-53, Lexington Mining Co. & Lexington Silver-Lead Mines, Inc., $750,000.00; 379-53, Porter Bros. Corporation, $285,000.00; 380-53, Robert P. Porter, Dorothy D. Porter, Alfred T. Hibbard and Margaret S. Hibbard, d/b/a, a partnership under the firm name and style of Porter and Company, $300,000.00; 412-53, Winston Bros. Co., $121,466.40; 455-53, Colorado-Montana Mining Assn., and Carl H. Peterson, managing trustee, $217,880.00.

NEVADA

Some claimants are: 50214, Consolidated Chollar Gould & Savage, $175,000.00; 220-53, Walter Haggerty, C. F. Madden and J. C. Perkins as directors and trustees of Northumberland Mining Co., a dissolved corp., etc., $1,161,569.43; 320-53, Guy M. Standifer, Guy M. Standifer (as Trustee), Louise A. Sullivan, S. D. Bechtel & Albert E. Schwabacher, as executors of the last will and testament of Kenneth D. Dawson, dec., Louise A. Sullivan, Andres Soriano & Anta-M-IXL-Selection Trust, Ltd., a corp., individually, and as copartners d/b under firm name and style of Dayton Dredging Co., a ltd. partnership, $2,087,727.64; 322-53, Dayton Consolidated Mines Co., $975,051.96; 325-53, Consolidated Virginia Mining Co., $287,490.68; 333-53, Sutro Tunnel Coalition, Inc., $227,000.00; 334-53, Comstock Tunnel & Drainage Co., $103,000.00; 350-53, Central Comstock Mines Corp., $550,000.00; 364-53, Diamond Gold Mining Co., a Nevada Corporation, $641,615.12; 373-53, Winnemucca Mt. Mining Co., a Nevada Corp., $12,241.00; 414-53, Roy A. Hardy, Bonnie T. Hardy, Royce A. Hardy and Alice H. Paulsen, $165,546.00; 321-53, (1) Wm. M. Donovan, an individual (2) Double King Mines, Inc., $449,064.84; 451-53, Standard Cyaniding Company, $700,800.91.

OREGON

Making claims are: 316-53, Idaho-Canadian Dredging Co. & Sunshine Mining Co. d/b/a Burnt River Division—Sunshine Mining Co., $281,869.15; 317-53, Idaho-Canadian Dredging Co. & Sunshine Mining Co. & The Lehman Corp. d/b/a Fairview Placers, $553,709.40; 401-53, Sumpter Valley Gold Dredging Co., and G. P. Lilley, Isaac Hunt and Harvey Dick, its stockholders, $210,000.00.

SOUTH DAKOTA

Leading claimants: 50195, Homestake Mining Co., $10,777,488.01; 50214, Bald Mt. Mining Co., Inc., $167,754.00.

WASHINGTON

Claimants: 395-53, Western Gold Mining, Inc., a Washington Corp., $250,000.00.

MISCELLANEOUS

70-53, Albert Dance, $84,073.00; 201-53, George C. Naseath, $181,860.00; 253-53, A. K. Wylie, Violet O. Wylie, Arthur Flournov and Lutie Flournov, $354,000.00; 240-53, Oregon-Detroit Mining Co., Inc., $49,436.00; 284-53, The Cambridge Mining Co., $51,595.00; 288-53, Buffalo Valley Mines Co., $55,500.00; 291-53, Don Steffa, Vallecito Mining Co., a corp., $150,000.00; 293-53, P. L. Murphy, t/a Red Lion Mining Co., $450,000.00; 301-53, (1) Melodile G. Hathaway and (2) Theodora Garbutt, $403,600.00; 302-53, Gerry W. Eden, $1,569,000.00; 304-53, Mervyn Rudolph Bach, as administrator of the Estate of Rudolph Charles Bach, $142,000.00; 307-53, (1) Grim Fields (2) George A. Jenkins (3) Edward H. Kaiser (4) J. W. Kaiser (5) Robert Kaiser; and (6) Byron Sanderson (7) Nora E. Watt, $90,849.75, $8,000.00; 309-53, St. Jude Mining Co., $230,546.14; 318-53, Charles Earle Pharmer, $15,000.00; 331-53, Feather River Mining Co., $40,000.00; 337-53, (1) Bernhardt S. Hendrickson (2) Samuel Hendrickson (3) Albert Saari, $8,667.00; 338-53, The Moroja Gold Mine Corp., $250,000.00; 343-53, Mutual Ventures Syndicate, $100,397.00; 352-53, (1) George J. Jensen & Sons, a copartnership comprised of (2) George J. Jensen (3) Carl T. Jensen (4) John W. Jensen (5) Donald B. Jensen (6) Edgar B. Jensen, $584,000.00; 358-53, John Funk, Trustee in Bankruptcy of the Boudler Mining Co., a corp., bankrupt, $1,925,890.00; 359-53, H. B. Chessher and Jane E. Chessher, his wife, $160,000.00; 362-53, Geyser Marion Gold Mining Co., $422,563.58; 365-53, Wesley J. Gritton, $100,998.88; 370-53, Peckham Hill Gold Mines, Inc., $217,565.60; 374-53, Security Industrial Corp., a corp., and H. B. Chessher and Jane R. Chessher, his wife, $498,000.00; 377-53, A. P. Lofquist, $198,353.00; 382-53, William J. Beatty, $877,000.00; 386-53, Florence J. Dennis, $290,000.00; 388-53, Margharite F. McLean, $1,500,000.00; 389-53, LeRoi Extension Gold Mining Co., $134,400.00; 390-53, Otto Brink, d/b/a El Dorado Gold Mine, $19,000.00; 391-53, Viking Gold Mines Corp., $242,000.00; 392-53, Rocky Mountain Gold Mines, Inc., $1,500,000.00; 394-53, Gold Dome Mining Corp., $152,500.00; 399-53, (1) George H. Parsons and (2) William I. Zoch, $547,128.72; 400-53, The Gold Mountain Mining & Milling Co., $10,000.00; 417-53, Eavery Swank & Van Galder, Inc., $84,000.00; 418-53, Flora Z. Wickham, $350,000.00; 419-53, Green Campbell Mining Co., $294,886.91; 420-53, Wilbur E. Timm and Maybelle A. Timm, $167,942.89; 423-53, John D. Hubbard, $26,000.00; 425-53, Warner Clark, $22,281.09; 431-53, Ace H. Alexander, $18,792.00; 432-53, Russell J. Wilson, $359,016.00; 433-53, W. W. Prather, $180,000.00; 434-53, N. C. Aldo, $150,000.00; 437-53, Fred W. Lyman and Dorothy L. Lyman, $116,000.00; 438-53, Red Bank Gold Mines, Inc., $50,000.00; 439-53, Roy T. Bowyer & Estelle W. Bowyer, $35,000.00; 442-53, (1) R. G. Amidon and (2) Carl A. Olson, as Trustees of El Primero Mining and Milling Co., $101,000.00; 444-53, Clay Zosel, William Zosel, Sr., & William Zosel, Jr., $80,000.00; 446-53, Consolidated Mayflower Mines Co., $10,000.00; 448-53, Vance Hitt, $182,256.36; 449-53, Vincent Bednar and Joe Bednar, $27,500.00; 450-53, John E. Ely, $354,000.00; 458-53, Edgecumbe Exploration Comanpy, Inc., $99,452.00; 459-53, Hall Livingston, $32,532.00; 460-53, Walter H. Remer, $112,000.00; 461-53, Edwin Von Goerlitz, $48,000.00; 462-53, Lynwood W. Davis, an individual, $45,000.00; 463-53, Al. B. Broyer, Marvin R. Fleming, Thomas C. Seitzinger, and the Estate of V. J. DeCampos, deceased, $35,416.46.

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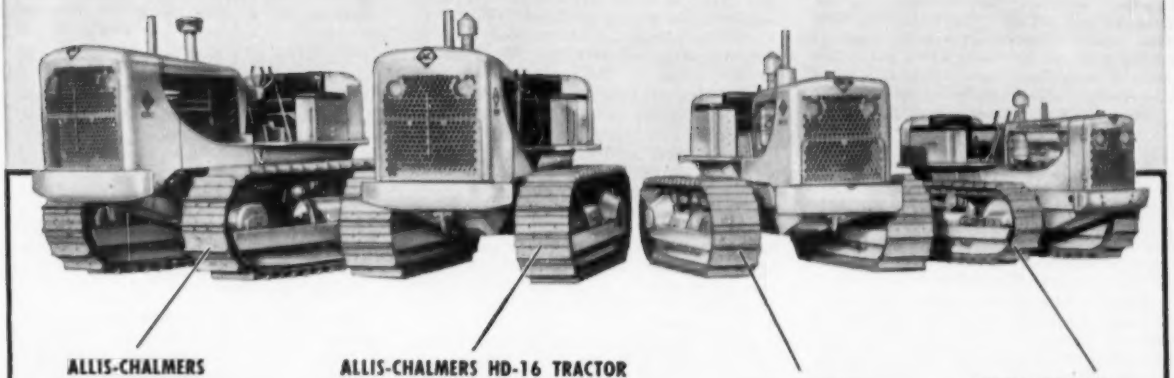

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Hp — 204 net engine
Weight — 44,000 lb
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Standard Transmission	Torque Converter Drive
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United States

Personalities in the News

GILL MONTGOMERY (right) has been advanced to the position of vice president of the Fluorspar Division of Minerva Oil Company at Eldorado, Illinois. Since 1952 he has served as general manager of that division. Minerva currently operates four fluorspar mines and two mills in Hardin County, Illinois, and is one of the nation's largest fluorspar producers. New additions to the company are JEROME J. DALY, formerly with Atlas Diesel Corporation in New York, as mining engineer; and WILLIAM T. RULE, formerly a metallurgist with Tennessee Copper Corporation, now metallurgist at Minerva Mine No. 1 mill, Cave-in-Rock, Illinois.

Wallace T. Miller, assistant district engineer of the United States Geologic Survey's surface water branch at Santa Fe, New Mexico, has been appointed district engineer succeeding **Berkeley Johnson**, who retired after 36 years of service.

Mark Lintz, a San Francisco consulting engineer, recently completed several months of exploration and sampling for cement raw materials in Arizona for the Republic Cement Company. Mr. Lintz has been retained to design a 1,000,000 barrel per year cement plant at Drake, Yavlapa County, Arizona.

Charles E. Melbye and **Stuart S. Merwin** are the new resident managers for Colorado Exploration Company, 1117 Washington Avenue, Golden, Colorado. This new company was formed by the merger of the firms of Melbye and Merwin and the former Colorado Exploration Company.

Kenneth Arbold of Boise, Idaho, has been named president and general manager of the Solar-X Uranium Corporation in Montana. Mr. Arbold was in charge of the firm's air exploration the past year. Other new officers of Solar-X are: **Doyle Simms**, vice president; **Waldo Thurber**, secretary-treasurer; **John Mazur, M. Edward Arbold, D. Ford McCormick, James Muller**, board members. **W. P. Johnston**, geologist, is acting as company consulting engineer.

O. E. (ED) POTHIER (right) has been transferred to the Pocatello, Idaho branch of J. R. Simplot Company to head operational activities of the mining department. Mr. Pothier first joined Simplot in 1948 and has served with the exploration department at the Boise office. PHILLIP T. PETERSON has also been transferred to Pocatello where he will work directly under Mr. Pothier and will be the project manager at the Centennial phosphate operation.

Ernest C. Anderson was promoted to grinding and flotation foreman at the Arthur plant of Kennecott Copper Corporation, Utah Copper Division. Mr. Anderson has previously served as utilityman, screenman, flotation operator, and flotation shift boss.

Raymond Sullivan has resigned as vice president of Continental Uranium, Inc. His duties have been assumed by **Robert Pruess**, general manager at Grand Junction, Colorado.

John Atkins has left the mine office of Manganese, Inc., at Henderson, Nevada, to work with Union Pacific Railroad as a geologist in the Barstow, California, area. **Charles Hawkins** is taking over his work at Manganese, Inc.

Herbert Hoover, Jr., Under Secretary of State, recently was awarded Columbia University's Kemp Medal "for distinguished service in geology." Mr. Hoover has supervised the exploration for oil and minerals in many parts of the world. He has invented equipment widely used in the search for petroleum; and adapted the mass spectrograph, an instrument for weighing atoms, so that it detects the presence of gas, often an indication of oil deposits.

C. E. Sloan succeeds **R. W. Miller** as president of the Bullion Butte Mining Company at Mobridge, South Dakota. **A. E. Lakeman** was re-named secretary and **Bill O'Hern**, treasurer. Named to three-year directorships were **Ray Doyle, Joe Norby**, and **Bill O'Hern**. Directors for one year include **Douglas Chapman** and **Leo Lemmel**.

R. J. Horsman has left his job as chief engineer for Day Mines, Inc., Idaho, to joint the exploration department of the Bunker Hill Company. He will be replaced by **Ray Giles** who returns to the Day Company after two years with Wah Chang Corporation at Bishop, California.

F. O. Davis, treasurer of Potash Company of America, Carlsbad, New Mexico, has been elected executive vice president of the company and managing director of Potash Company of America, Ltd., the company's wholly owned subsidiary in Canada. Mr. Davis, who joined PCA in 1936 as controller, is the administrative employee with the most years of service. Prior to 1936 he served as treasurer of U. S. Vanadium Company in Denver, Colorado, and of the Radium Company of Colorado. He is a former president and director of the New Mexico Mining Association and a member of the AIME.

A. R. Patterson has been appointed vice president and general manager of Knob Hill Mines, Inc., Republic, Washington. He was formerly general superintendent at Republic.

Melvin E. Richards was recently elected president of Yucca Uranium, Inc., an Albuquerque, New Mexico corporation which has extensive uranium and manganese operations in the Grants and Socorro areas of New Mexico.

H. R. BURCH (right) has been promoted from mine superintendent to assistant general manager of Anaconda's Weed Heights, Nevada operations. Mr. Burch has been with Anaconda since 1942, working for five years at its property at Cananea, Sonora, Mexico, followed by five years at one of the Arizona properties, and since the latter part of 1951 at Weed Heights. C. J. HOUCK succeeds Mr. Burch as mine superintendent.

Charles J. Kundert, geologist with the California Division of Mines since 1951, has taken a position as geologist with the Utah Construction Company in San Francisco.

John A. Lentz has taken the job of general superintendent of the New Cornelia Branch of Phelps Dodge Corporation, Ajo, Arizona. **James A. Briggs**, assistant mine superintendent, replaced Mr. Lentz. Mr. Lentz joined the New Cornelia staff in 1935 as a mining engineer.

Deane F. Kent is exploration supervisor in charge of the new Eastern United States Division of American Smelting and Refining Company. The new office is at 2640 Broadway, N. E., Knoxville 17, Tennessee.

George Copeland has joined Continental Uranium, Inc. as chief project engineer and metallurgist with headquarters at the Chicago office. His background includes experience as president and general manager of several mining and ore processing companies. Other additions to the metallurgical staff at Continental include **Harry Moulton**, formerly with AEC contractors, and **Ken Royer**, formerly of the U. S. Bureau of Mines. Geologist and metallurgist **J. C. Ternahan** has transferred to the mill staff.

Floyd W. Erickson, who was general superintendent of Reserve Mining Company's Silver Bay, Minnesota operation, has been transferred recently to the company's rapidly growing Babbitt Division and advanced to the position of manager there. Before joining Reserve in 1951 as chief mining engineer at Babbitt, Mr. Erickson had spent nine years in Chile and Bolivia with tin and copper concerns, and had been with the U. S. Engineers and the U. S. Bureau of Mines.

BLAIR W. STEWART, vice president of Coronado Copper and Zinc Company, Los Angeles, has been appointed to the California state mining board for a four-year term. Mr. Stewart is one of two men from Southern California serving on the five-man board which is a policy making body of the California State administration.

Newsmakers in International Mining

R. B. MAHAN is the new general superintendent of the Philippine Iron Mines, Inc. at Larap, Jose Pañganiban, Camarines Norte, in the Philippine Islands. Mr. Mahan is the past general superintendent of the Baguio Gold Mining Company, Baguio City, also in the Philippines. Philippine Iron Mines is the largest single supplier of ore in the Islands. It operates a large mechanized open-pit mine, several smaller pits, and an underground mine at Larap on the east central coast of Luzon.

Gloyd M. Wiles, manager of the National Lead Company's mining department, has been in Australia visiting the beach sand mining operations and concentrating plant of National's subsidiary, Titanium Alloy Manufacturing Company, Pty. Ltd. TAMCO is the major source of rutile for National Lead Company's partially owned subsidiary Titanium Metals Company at Henderson, Nevada. TAMCO operates suction dredges and concentrating plants on barges using fanning concentrators. Production will soon be up to 15,000 tons of rutile annually.

Dr. R. Alberts, W. B. Harris, and **D. Holliday** of the United States Atomic Energy Commission have returned to the United States after investigating the effects of radiation on gold and gold-uranium mine workers in Union of South Africa. They report that radiation exists, but is generally within the safety or tolerable limits.

Eric E. Howell has been chosen principal of the Copperbelt Technical Foundation in Northern Rhodesia. Mr. Howell is at present principal of Pietermaritzburg Technical College in Natal. The Foundation has been allocated £400,000 by the copper mining companies for the training of engineers.

J. P. Caulfield, assistant to vice president (mining) of Kennecott Copper Corporation, recently attended the opening of the reduction plant of Merriespruit Orange Free State Gold Mining Company, Ltd., Union of South Africa, and poured the first symbolic bar of gold. With an investment of many millions, Kennecott is the major shareholder in the Merriespruit mine.

K. D. McBean, of the Consolidated Mining and Smelting Company of Canada Ltd. metallurgical staff, sailed for Yugoslavia recently. He will act as consultant metallurgist to the Zorka Company at Sabac in connection with the start-up operations of the new electrolytic zinc plant. Mr. McBean will return to Canada late in June by way of Turkey, Greece, Italy, France, and Belgium, visiting metallurgical plants en route.

Dr. W. Rohland, owner of the West-Deutsches Ingenieur Buro Dr. Rohland AG, (Wedexro) Dusseldorf, Germany, is in Indonesia with his chief geologist, Dr. H. Martini, to investigate for the State Planning Bureau the possibilities of establishing iron blast furnaces. In cooperation with Djawatan Geologi at Bandung, Wedexro will make surveys at South Lampong (South Sumatra), Djampang Kulon near Sukabumi (West Java), Celebes and South Borneo. If the survey results are favorable, Indonesia will possess iron blast furnaces in about five years.

Herbert M. Weisz has been appointed general manager of the Empresa Minera Catavi of the Bolivian Mining Corporation. He formerly was mine superintendent at Siglo XX of the same company, and acting general manager since August 1955.

Kenneth Brownell, president of American Smelting and Refining Company Ltd., visited in Australia recently with **Oscar Strauss**, treasurer of the company, and **William Foster**, a director of Enfield Rolling Mills, England. Plans for the proposed copper and zinc refineries at Mount Isa Mines Ltd. were discussed.

Anton Gray, formerly with Kennecott Corporation in the United States, has been appointed a director of Hartebeestfontein Gold Mining Ltd. and Eastern Transvaal Consolidated Mines Ltd. of the Anglo-Transvaal group in South Africa. He is also a director of the Merriespruit company.

James M. Joice is now managing director of the Western Titanium N.L. at Perth, West Australia. He was previously with Angloriental Ltd., Kuala Lumpur, Malaya.

Winkelhaak Mines Ltd., a new company in the Union of South Africa in public flotation under the auspices of Union Corporation Ltd., has appointed new directors: **M. D. Banghart** (Newmont Mining Corporation), **W. M. Frames** (Corner House Group), **E. Jacobson** (Anglo-Rand Corporation), **H. C. Koch** (Anglo American group), and **Dr. M. S. Louw** (Federale Mynboumaatskappy). These are in addition to the original directors, all of the Union Corporation group, who are **T. P. Stratten**, chairman, **C. B. Anderson, I. T. Greig, M. W. Richards,** and **J. S. Walker.**

George Hawn, sub-manager of the Technical Section of Corporacion Minera of Bolivia, resigned recently after a serious illness.

MORITSUNA SAIGUSA, chief geologist of Mitsubishi Metal Mining Company's Akenobe mine (tin-tungsten - copper - lead - zinc), Japan, is making an around-the-world inspection trip. His United States stops include the United States Geologic Survey at Colorado School of Mines; Climax Molybdenum Company, Colorado; and E. J. Longyear Company, Minneapolis, Minnesota.

RUSSELL R. BRYAN, JR., San Francisco mining and construction consultant, is on an extended mine examination trip in Latin America. He is investigating iron ore deposits in the Dominican Republic, cement raw materials in Guatemala, and iron ore deposits in Venezuela. While in Venezuela he will also determine the economics of bringing undeveloped iron deposits into production by making transportation surveys. He formerly was mine superintendent at Cerro Bolivar, Venezuela for Orinoco Mining Company.

Claude W. Courand has been appointed general manager of Cerro de Pasco Corporation's Chilean operations, with headquarters in Santiago, Chile. Mr. Courand has previously held the position of counselor for economic affairs as a member of the United States foreign service in Santiago. Preceding his tour of duty as counselor for the embassy in Chile, he served with the Defense Materials Procurement Agency where, as regional director for ten South American republics, he arranged for the acquisition of strategic defense materials.

B. Christophers, production superintendent of Electrolytic Refining and Smelting Company of Australia Pty. Ltd., Port Kembla, leaves on a five-month trip to Europe this month. He will visit plants at Hoboken, Belgium; Hamburg, Germany; and Outoukumpu, Finland.

H. F. Melouney, former manager for Territory Enterprises Pty. Ltd. Rum Jungle, Australia, has been named assistant to **F. S. Anderson** of the Melbourne office, Consolidated Zinc Pty. Ltd. **J. E. Tonkin** will take over as manager at Rum Jungle.

J. N. Mackenzie is new director for Rand Mines Ltd., Union of South Africa, filling the vacancy caused by the resignation of **Sir George Albu**, Bt., of the General Mining Group.

N. H. van Doorninck, formerly of The Hague, The Netherlands, will assume new duties as advisor on prospects and mining properties to Marino Olondriz y Cia in the Philippine Islands.

William J. Bennett has joined the research department at Electrolytic Zinc Company of Australia in Tasmania. He was formerly with the Department of Mines, Radium Hill.

C. Gunther, mining engineer, is investigating iron ore deposits in Bandung, Indonesia for Djawatan Geologi. In the past Mr. Gunther has been employed in exploration projects for manganese, copper, and beryl in Rhodesia, and coal and cement in China.

A. K. Denmead has been appointed chief government geologist for Queensland, Australia.

Seminole Rock Products of Miami, Fla., bought five CAT* DW15s with W15 Wagons on the basis of its previous experience with Caterpillar products. Dragline loaded with lime and coral rock, these units make a 1650-ft. haul (with short 10% adverse grade) over excellently maintained roads to the processing plant, and 2000-ft. return. After the Caterpillar DW15s had been on the job long enough to show what they could do, here is what General Manager L. G. Bunnell had to say:

"These DW15s have power to spare. With an average load of 15.2 yd. (45,600 lb. actual weight), haul and return time is only 4.09 minutes. The five units haul 358 cu. yd. per hour—estimated hauling cost is only 9.2¢ per yard. Thanks to their powerful Cat Engines, the DW15s started up from the dragline in second gear, high range.

"We are particularly satisfied with their extreme economy. In more than 1600 hours of combined operation, these five new Caterpillar DW15s have had no down time. Their rugged construction and trouble-free operation are important factors in cutting costs. Important, too, are their ease of maintenance and their ability to deliver full, foul-free power on No. 2 furnace oil.

"We like the high maneuverability of the Cat DW15 and W15 Wagon," Mr. Bunnell concludes. "This, with their dependability and power, speeds up our operation considerably."

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Final Ratification Made In World Tin Agreement

With the ratification of the International Tin Agreement by Indonesia the way is now clear for the United Kingdom, the custodian power, to make preparations to put it in operation.

The Agreement was first approved by the United Nations Tin Conference at Geneva in 1953. Nine consuming countries holding at least 333 votes and producing countries having at least 900 votes were required for ratification. Indonesia's approval brought the producing countries' ratification to 934 votes, with only Thailand abstaining. Of the consuming countries, 10 of the 18 represented ratified the Agreement with a total of 357 votes. The United States (490 votes), along with Federal Republic of Germany, Switzerland, and Brazil, never signed. Italy, Japan, Lebanon, and Turkey signed but failed to ratify.

Aspects of the Agreement include establishment of a buffer stock and the acquisition of 25,000 tons of tin metal to be contributed by producing countries. Export controls are to be set up when market conditions warrant and when the buffer stock has absorbed a minimum of 10,000 tons. The buffer stock, operated by a manager, will depend on the relation of the market price to the floor and ceiling prices. A floor price of £880 per long ton will be established.

Preliminary meetings of the International Tin Council have been held in London. At the first regular meeting, the Interim Committee will propose M. Georges Peter, a civil servant in the French Overseas Territories since 1930, as chairman. W. K. Davey, past chairman of the London Metal Exchange, will be proposed as manager of the buffer stock, and William Fox, secretary-general of the International Tin Study Group at The Hague, as secretary. The Agreement provides for at least four meetings a year in London.

Banner Plans To Double Copper Mill Capacity

Plans are underway to double the 500-ton capacity of Banner Mining Company's milling plant southwest of Tucson, Arizona. Currently the company is employing 240 men and producing from two underground mines, the Mineral Hill and the Daisy, located in the Twin Buttes area. In addition, Banner is engaged in an exploration program at the Copper Glance mine, seven miles south of the present operations. A. B. Bowman is vice president and general manager.

Cuba Completes First Ore Dressing Laboratory

Cuba's first mineralogical laboratory has been opened by the government's Agricultural and Industrial Development Bank. The Jose Isaac del Corral Laboratory for Mineralogical Investigations is located outside Havana. Construction and operation of the laboratory have been supervised by a Point Four mining engineer, Charles E. Bartlett. He is being aided by three Cuban technicians who received a year's training in the United States.

The laboratory has equipment which will enable it to identify minerals, to determine their chemical composition, and to determine the processes best suited to recover the minerals. The laboratory has five sections: preparation of samples, chemical analysis, assaying, economic studies, and concentration of minerals.

African Copper Firms Aid Government Construction

The great need for hydro-electric power and improved railroads has resulted in the cooperation of South Africa's two major copper mining companies to aid the Government of the Federation of Rhodesia and Nyasaland in development projects. Anglo-American Corporation of South Africa and the Rhodesian Selection Trust have agreed to furnish £20,000,000 during the next five years to assist the government in providing capital for the Kariba hydro-electric and other necessary construction. The sum will be invested in Federal Government Development Bonds and will be supplemented by a surcharge on the price of power from Kariba during the period 1961 to 1967, which will provide an additional £10,000,000.

Since the loan will be divided among the producing companies in proportion to their profits, Nchanga Consolidated Copper Mines Limited and Rhokana Corporation Limited will be responsible, between them, for a little more than half the total.

A further investment of £4,000,000 will be made by British South Africa Company and £2,000,000 each by Barclays DC and O, and the Standard Bank of South Africa. Total cost of the Kariba power system has been estimated at from £100,000,000 to £120,000,000 by the time it is completed.

Plane Crashes in Chile While on Anaconda Survey

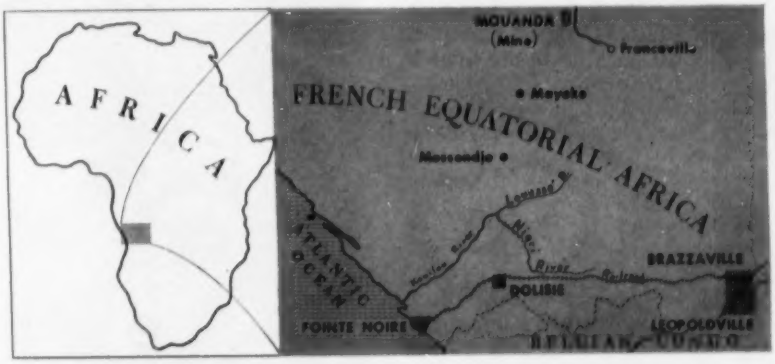
Chile Exploration Company's chartered airborne geophysical survey plane crashed in treacherous terrain of Antofogasta Province, Chile, on April 1. The plane was a twin-engine AT-11, equipped with the Varian precession magnetometer. The four men aboard were slightly injured. Cause of the crash has not been determined.

Chile Exploration, a subsidiary of The Anaconda Company, operates the huge Chuquicamata open pit in that area. For the airborne exploration program, Chile Exploration had hired Hycon Aerial Surveys Inc. of Pasadena, California.

Indian Group Recommends Mineral Expansion Plans

Government representatives and mining experts have drawn up a five-year mineral development plan for India which will be submitted to the Mineral Advisory Board for approval. The recommendations, which were formulated at a conference in Nanital, include the following:

Development of lignite deposits in the state of Rajasthan with help of Colombo Plan authorities; investigation of gypsum, copper, lead, and zinc resources in Sub-Himalayan region of DehraDun, Tehri Garwal and Almore by Geological Survey; development of copper mines in Daribo and Khetri areas of Rajasthan by Indian Bureau of Mines; establishment of mica mining operations in Rajasthan; research to provide clay, feldspar, and quartz for ceramic industry; survey of iron ore deposits in Sidhi; preparation of monograph of Vindhya Pradesh region's mineral resources.



U.S. Steel's African Manganese Interests

The United States Steel Corporation holds a 49 percent interest in the manganese deposit at Mouanda, French Equatorial Africa, whose location can be noted on the map above. Working with U.S. Steel in the project are Compagnie Miniere de L'Oubangui Oriental, Group Mokta Hadid, and Bureau Miniere de la France d'Outre-Mer. Together, they have formed Compagnie Miniere de L'Ogoue. The ore is covered by two to 14 feet of overburden. Holes are being drilled at intervals to obtain samples for determination of the ore grade, as well as the extent of the deposit; however, estimates have placed the manganese content between 40 and 50 percent, with reserves reported as large as 100,000,000 ton. Transportation of the ore to the port at Pointe Noire, on the Atlantic Ocean, is a major consideration in development of the project. A railroad exists between Brazzaville and Pointe Noire, but the distance from the mine to the nearest rail line is 200 miles. To bridge this gap, both a railroad and an aerial tramway have been considered. Latest possibility also receiving consideration is establishment of a ferro-manganese plant at the mine site. This, in turn, would require construction of a power plant. Societe d'Electro-Chimie, d'Electro à Metallurgie et des Aciéres Electriques d'Ugine, also prospecting in the same area, would join in this plan if it is carried out. The Societe has set up a local subsidiary to study the feasability of establishing a ferro-manganese company in the country.

INCREASING FOOTAGE OF DIAMOND CORE DRILLS

with Stoody Acetylene Tube Borium

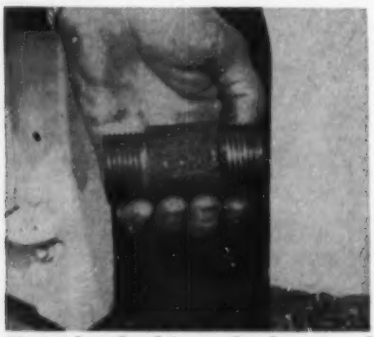
When we think of diamond studded tools, hard-facing seems unnecessary... after all, the diamond is nature's hardest, most wear resistant substance. Although core bits and their connecting reamers are set with industrial diamonds for extending overall life, the barrels and flutes don't benefit by these inserts. Here's how one operator increased footage of sampling drills from 400 or 500 feet to between 2000 and 3000 feet.

After making comparative tests of several hard-facing materials, 30-40 Acetylene Tube Borium (containing tungsten carbide particles) was selected because of its excellent wear resistance. Reamer bodies were hard-faced with a series of parallel longitudinal beads, the deposits extending around those areas containing the diamond inserts.

Since walls of the core barrels are thinner at each end because of internal threads, wear weakens these areas quicker than the remaining barrel. By hard-facing back 6" from each end and adding extra protection over the threaded areas overall barrel life is equalized. When the hard metal is gone the entire barrel has delivered maximum service. Flutes, attaching core barrels to drill rods, are hard-faced on outside diameters.

Straight edge of saw blade shows how hard-faced end of barrel has held its size.

Stoody Hard-Facing Alloys afford maximum protection to all wearing equipment. For recommended alloys and application technique on your specific wear problems refer to the Stoody Hard-Facing Guidebook. Your Stoody dealer has a copy for you or write direct.



Notice how hard-facing beads surround but do not cover diamond inserts.

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Morocco Correspondent Reports Disastrous Effect of Rebellion on Local Mining Industry

This report was received from MINING WORLD's *correspondent in French Morocco just prior to the formation of a new separate country. The effect of the rebellion on the mining industry is described first-hand. Restoration of law and order will undoubtedly be one of the first functions of the new government; second function will probably be an increase in taxation which will adversely affect most of the mines.—Ed.*

Repeated attacks on isolated Moroccan mines by armed rebel bands have resulted in the closing down of three small enterprises while a fourth threatens to close its doors also if adequate measures to protect lives and property are not taken by the authorities.

All European engineers and miners with their families have been evacuated from the Tisili N'Roumi lead mine, operated by the Omnium de Gérance Minière Marocaine; from the Djebel Khettem antimony mine and the Narguechoum manganese mine, operated by the Société Cherifienne des Mines. Sixty-six persons are involved, not including native personnel.

These three mines are located in wild and rugged country in the Middle Atlas mountains, west of Khenifra, where armed rebel bands estimated to number several hundred men staged several attacks on mining installations. The aim of the attacks, according to security officials, is to procure arms and explosives for delivery to the large rebel forces in the Riff mountains to the north.

Early in March, the fourth mine was attacked by rebels for the third time when one European electrical engineer and one native guard were killed. Located at Djebel Aouam, and run by the Royal Asturienne des Mines, an important Belgian firm, this mine is the most important one to be affected. It produces up to 5,500 tons of lead ore a year.

A platoon of native guards has been sent to the Djebel Aouam mine in response to an urgent appeal from the manager, but work is still held up because native mining personnel have been threatened with death by the rebels if they continue to work for Europeans.

Similar threats have been made by rebels to truck crews taking manganese over the High Atlas Mountains from the Imini and Tiouine mines, owned respectively by the Société Anonyme Chérifienne d'Etudes Minières and the Tifnout-Tiranimine Co., an associate of the Omnium Nord Africain. Imini produces about 160,000 tons of mineral at 50 percent per year and Touine about 43,000 tons at 40 percent a year. The mineral is transported over a lonely road which crosses a 12,000-foot pass in the Atlas by means of a fleet of 156 United States trucks (Mack trucks) operated by a separate company, the Société de Transports Miniers.

Traveling often at night in convoys, the trucks have been frequently held up by road blocks of boulders on hairpin bends. When the crews stop to remove the obstacle, snipers hidden behind rocky crags take pot-shots at them when they appear in the headlights. When a single truck ventured to make the trip alone in daylight, it was held up by a group of about a hundred outlaws who warned the crew they would be shot if they continued to haul minerals. This intimidation is having a bad effect on the morale of truck crews although actual mining operations are continuing normally. The result is that a transportation bottleneck is developing.

There are signs that the rebels are becoming bolder. The Djebel Sahlef lead mine, run by an affiliate of the Omnium Nord Africain, was attacked at midnight February 26 by a small band of rebels who assassinated a European miner's wife and made off with several shot guns and a case of cartridges. Since this incident, platoons of native guards have been posted in the area south of Marrakesh where several manganese, lead, antimony, and one cobalt mine are located.

In eastern Morocco, in the area around Oujda where the important Zellidja Company's lead and zinc mines and the Djerada Company's coal mines are located, rebel activity is the most intense. Although the actual mines have not yet been attacked, most of them being well-guarded, the tense atmosphere and repeated threats issued in tracts signed by the rebels have had the effect of cutting down production because of the low morale of native workers.

All prospection operations in the field have been suspended in Eastern Morocco because of the insecurity, and the Zellidja's lead smeltery at Oued el Heimer is currently working at half rate because of the workers' disinclination to work for the 'infidels.' This smeltery, which produces about 40,000 tons of lead metal a year, is Zellidja's key installation, and if the hold-up continues it may have a serious effect on overall production, an effect which would be felt by Morocco as a whole because lead and zinc production form very important links in the country's economic chain.

Atlas' Copper Cost Was 19.00¢ Per Pound In 1955

Atlas Consolidated Mining and Development Corporation produced copper at its Toledo mine, Cebu, Philippine Islands, at a cost of 19.00 cents per pound in 1955, according to president Colonel Andres Soriano. With the current expansion to 10,000 tons daily well underway, he hopes that this cost can be reduced to 15.00 cents.

At the open-pit mine, additional stripping equipment will make it possible to completely strip the oxidized capping over the ore body in 1956. In 1955 1,028,678 tons of ore were mined and 2,825,832 tons of waste stripped. Total mining cost, including waste stripping, amortization of equipment, and depletion, was Pesos 1.676 per ton. Milling cost for the year was Pesos 2.248 per ton. Official exchange is 2.0 Pesos to $1.00 USA. Because of the lower than estimated stripping costs, it will be possible to enlarge the open pit in order to recover additional ore by pitting than had originally been planned.

Atlas is going ahead with its plans for a sulphuric acid plant and phosphate fertilizer plant at Sangi Port to use by-product pyrite concentrate. Target date for completion is October 1957, with full production of 120 metric tons of sulphuric acid and 100 tons of gypsum per day on January 1, 1958.

At the company's Mati iron mine in southern Mindanao, the first shipment of high-grade iron ore was made to Mitsubishi Metal Mining Company in Japan early in April. Production will be at the rate of 500 tons per day.

Texada Expands Output To Meet Japan Contract

As the result of a new contract with Japanese steel mills, Texada Mines, leading producer of iron ore in British Columbia, will ship 700,000 long tons of magnetite concentrate starting in August. Earlier this year Texada agreed to supply 250,000 tons to Japanese interests (see MINING WORLD, January 1956, page 67).

Stepped up operations will produce 30,000 tons of concentrate per month. To meet this goal a process for treating the dry magnetic concentrate with fine grinding, magnetic separation, and flotation has been devised for Cameron-Yellow Kid mine ore. The dry magnetic separation method formerly used will not make a saleable product from the ore in the upper portion of the Yellow Kid mine, and copper recovery was a troublesome problem. The process will yield a magnetite concentrate assaying about 64 percent iron. About 500 tons of copper concentrate will also be recovered monthly.

The plant addition at Yellow Kid, costing about $1,000,000, will be completed in August. Meanwhile, diamond drilling to locate extensions of the Yellow Kid orebody is now being conducted for both magnetite and copper.

Freeport Launches Plans For Cuban Nickel Plant

Plans for the construction of a $45,000,000 to $50,000,000 nickel plant are being initiated by Freeport Sulphur Company at its Moa Bay deposits, in Cuba, 500 miles east of Havana. Nickel reserves at Moa have been found at depths of 35 to 100 feet, and the new plant will produce about 30,000,000 pounds annually.

Building of highways, air landing facilities and docks is to begin immediately. Construction of the plant will start by December 1956.

The Moa Bay deposit is located so near to the coast that the output of the grinding and pulping plant at the mine reportedly will be pumped to a processing plant at tidewater, with the briquetted metal shipped directly from that plant.

Mt. Isa Will Build Copper Refinery in Queensland

Mount Isa Mines Ltd. at Mount Isa, Queensland, Australia, will build a copper refinery, probably at Stuart, six miles from Townsville, where land has been obtained. Power will come from the Tully Falls hydroelectric project, when completed. It is believed that the refinery will involve a construction program of up to three years in length, and that United States contractors will undertake much of the work (Utah Construction Limited). No further report has been made regarding the proposed zinc re-

finery which could be located near Townsville or Bowen, where the company controls its own coal mine.

NORWAY—A committee of the Norwegian Parliament has given approval to a contract between the Ministry of Industry and A/S *Elekrokemisk* for supplies of electric power for the proposed new aluminum plant at Mosjoen in northern Norway. Initial production of the plant is to be about 20,000 tons per year. This will be expanded when power supplies become available. Under the agreement approved by the committee, the state is to supply 50,000 kilowatts of electric power. This supply will end in July 1970 if the firm develops its own hydro power in the interim.

SCOTLAND—The exploratory crosscut being driven by *Lowland Lead Mines* into virgin ground west of the main vein system had advanced 296 feet by the end of 1955. It intersected two veins carrying lead values and driving on these veins has been started. It has now been established that the mineralized zone extends southwest beyond the old *Wanlockhead* workings. Most of the machinery for the mill has been delivered or will be available in a few weeks. It is anticipated that the mill will be operating by next September.

YUGOSLAVIA—It has been announced that a team from the Institute for Geological Research has discovered fairly large areas of chrome mineralization near Kumanovo, Macedonia. Further reports indicate that the ore basin is now considered to be more important for its strata of nickel and cobalt.

ITALY—Zinc production increased to about 73,000 tons in 1955, as compared with 70,000 tons in 1954.

NORWAY—Last year, by geophysical exploration in the Karasjokk district, wide occurrences of iron ore were found. Further exploration and examination will be made this summer, and may continue for several years. The Karasjokk district is located in Finmark in north Norway, not far from the Finnish border. In the same general area, some copper-pyrite has also been found in the Kautokeino district. Further work will be conducted this summer to determine the value of the deposits. *Boliden Company* of Sweden did some geophysical examination work, but this has now been taken over by the Norwegian state.

EIRE—*Irish Copper Mines*, controlled by *Mogul Mining Corporation* of Toronto, is making rapid preparations for ultimate production of 3,000 tons per day at its property about 40 miles south of Dublin. A spiral haulage-way has been started which will accommodate two-way traffic. Eventual depth will be nearly 1,000 feet vertically. Sublevels will be cut at 60-foot vertical intervals, permitting development and stope preparation work in a short time. First ore to be mined will be in the hanging wall, estimated to contain several million tons from surface to the 600-foot horizon. Production goal is mid-1957. Metallurgy has been completed, surface rights for the concentrator site have been purchased, and foundations for permanent camp buildings are being poured. Recent drilling increased total reserves to about 20,000,000 tons.

SPAIN—*Minera Celdran* S.A. of Cartagena, Province of Murcia, has been authorized by the Direccion General de Minas to build a smelter for zinc sulphide processing. The new plant would treat 40,000 tons of concentrate per year and would be increased eventually to produce 18,000 to 20,000 tons of electrolytic zinc annually. The concentrate from the Celdran mines has been exported for processing until now. Cost of the project is about 300,000,000 pesetas; value of the imports required, included machinery and smelting furnace, is estimated to 33,000,000 pesetas.

EIRE—It is reported that the Canadian firm which is interested in the copper deposits at Beauparc, County Meath see MINING WORLD, February 1956, page 80) is the *New Laguerre Mining Corporation* of Toronto. This same group is also surveying known lead deposits in the country. If any development work is under taken, a subsidiary firm will probably be organized in Ireland.

EUROPE—Iron ore production in the European Coal and Steel Community set a record with an output of 76,010,000 tons in 1955. This was an increase of 17 percent or 11,000,000 tons over 1954. France increased production from 44,000,000 tons to almost 51,000,000; West Germany's ouput rose from 13,000,000 to 15,600,000 tons; Luxembourg from 5,800,000 to 7,200,000 tons; and Italy produced 2,100,000 compared with 1,600,000 in 1954.

HUNGARY—Under construction is another iron ore dressing plant which will

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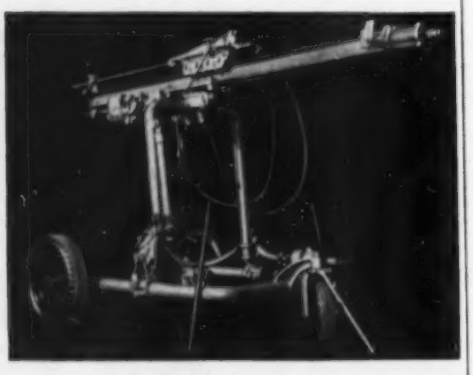

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DEEP SLOTTED CHIP-WAYS allow cuttings to escape readily; the bit does not regrind its own cuttings.

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CONCENTRIC PRECISION MILLED SEATING SURFACE permits full contact of bit threads and rod threads. The bit seats firmly against the drill rod upset, radial play is prevented and life of threads and rods is lengthened.

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be located at the foot of the Bukk Mountains near the town of Miskolc. The £1,000,000 plant will be fully automatic. Twelve miles of railroad track are being laid to connect the plant with the steel mills and mining town of Rudabanya. The plant will beneficiate the iron ore destined for the Lenin Metallurgical Works at Sztalinvaros and the Ozd works.

U.S.S.R.—Pro-Communist newspapers have reported the recent discovery of iron ore deposits in western Siberia. The extent and nature of the ore has not been revealed, but the deposits are said to be large enough to provide all of the necessary raw material for the new metal plants to be established in western Siberia under the sixth five-year plan.

BRAZIL—*Companhia Siderurgica Nacional*, which owns the *Volta Redonda* steel plant, has acquired a large and important dolomite mine located in the districts of Barra Mansa and Barao de Juparana in Paraiba Valley, about 61 kilometers from the plant. The reserves are estimated at 500,000 metric tons, containing 23.89 percent MgO and 30.15 percent CaO; the phosphorus and sulphur are insignificant. This new mine is expected to produce 7,000 metric tons monthly.

CHILE—Reports from Chile indicate that the *Anaconda Company* is studying the possibility of erecting an atomic power plant. According to Carlos Ruiz, Under-Secretary for Mines, Chile has 12 uranium deposits in the province of Atacama with the mineral content varying from 0.2 to 0.3 percent U_3O_8; however, samples have been found to assay as high as 2.0 percent. The Chilean government intends to form an agency which will establish buying sources.

MEXICO—*Compania Minera Azteca S.A.* has started operation of a 50-ton flotation plant which will treat lead-zinc-silver ore from the *San Bernabe* mine located northeast of Zacatecas. Arturo Avril, acting general manager, states that within the next six months new zones will be opened in the mine, and as soon as these reserves can be estimated the mill will be increased to 150 tons.

ARGENTINA—A concentrating plant has been built in the mining district of Jachal, San Juan, by *Minarbipa, S.R.L.*, and operations are expected to begin shortly. In its first stage, the plant will produce high-grade molybdenite; later, it will treat manganese ore. The plant covers 13 hectares, and is near the Salto de la Loma hydroelectric power plant which will furnish the necessary electric power.

CUBA—The *Nicaro plant*, which is operated for the government by *Nickel Processing Company*, has acquired most of the heavy equipment of the *Westmoreland Manganese Corporation*. The equipment had been placed at auction in Cushman, Arkansas, in lieu of a $2,800,000 debt to the United States government. Nicaro representatives bid and they obtained the equipment.

CUBA—Production at a new gold operation in Las Villas province is expected to start just as soon as equipment, now on order, is delivered to the property. The mine is located near the town of Placetas in an area which has included other gold mines, such as *Mina de Oro*, and *Diez Onzas*. Raul Loran, one of the mine owners, points out that the gold in this area is found with serpentine and not with quartz. The new machinery will separate the gold.

CHILE—*Bethlehem Chile Iron Mines Company* brought the *Romeral* mine into production in December 1955. The ore stocking and loading installations built at Guayacan Bay near Coquimbo, handle the ore mined at Romeral, as well as ore purchased from other Chilean producers. Mining operations at El Tofo are nearing an end; this operation has supplied ore for Bethlehem furnaces in the United States since May 1922.

FRENCH GUIANA—Mine production from Guiana in 1955 was about 10,000 kilograms of columbite-tantalite and 300 kilograms of gold. During the year some other columbite-tantalite deposits were discovered, and the search for additional diamond sources is continuing.

MEXICO—*Compania Metalurgical del Central*, located at the north end of the city of Zacatecas, has been working successfully in draining the Necochea shaft in the *Nevada* mine. The company has a 150-ton flotation mill. Heads going to the mill average 250 grams silver, 2 grams gold, 6 percent lead, and 7 percent zinc per ton. The concentrates are shipped to the *Compania Metalurgica de Penoles* at Torreon, a subsidiary of the *American Metal Company*. Juan Reyes is acting as general manager.

VENEZUELA—*El Pao* mine of *Bethlehem Steel Corporation* produced 3,000,000 tons of ore during 1955. Additional housing and welfare projects at the mine and port were completed during the year, and a floating dock for handling general cargo and supplies was installed at Palua.

CUBA—New copper mines are reported to be almost ready to begin production. Three of these are located near the Estra Palma sugar mill in Oriente Province, where laboratory analysis has shown that some veins carry 14.95 percent copper. One vein is estimated to be one kilometer long and four feet wide. The ore from these mines is to be brought to Havana by rail for export, according to the *Cobres Unidos Company*. Other copper mines in this province includes the *La Bruja* (The Witch) near Santiago de Cuba, and a mine in the Caracas Peak of the Sierra Maestra Mountains. Another new mine is also scheduled for production soon—the *Mi Esperanza* (My Hope) near Cienfuegos. Meanwhile, the National Economy Board reports that Cuba exported 24,201 metric tons of copper valued at $4,168,000, between January and May of 1955.

BRAZIL—Important and reportedly rich deposits of manganese ore have been located in the district of Guacui, Espirito Santa State. The deposits cover an area of 1,630 square kilometers and this areas has been entirely mapped by air. The average manganese content in the ore is about 40 percent.

VENEZUELA—The Center for the Evaluation of Hydrocarbons and Natural Resources has been established to determine the technical utilization and commercial possibilities of Venezuelan minerals, including petroleum. It will not be restricted to laboratory work, although

it is well equipped to handle this; essentially, it is to evaluate the potential relationship of every mineral to the national economy after thorough scientific analyses. The government wants to free the country from dependence upon foreign technical aid for the evaluation of its natural resources. The research center is located in Caracas and is attached to the Ministry of Mines and Hydrocarbons.

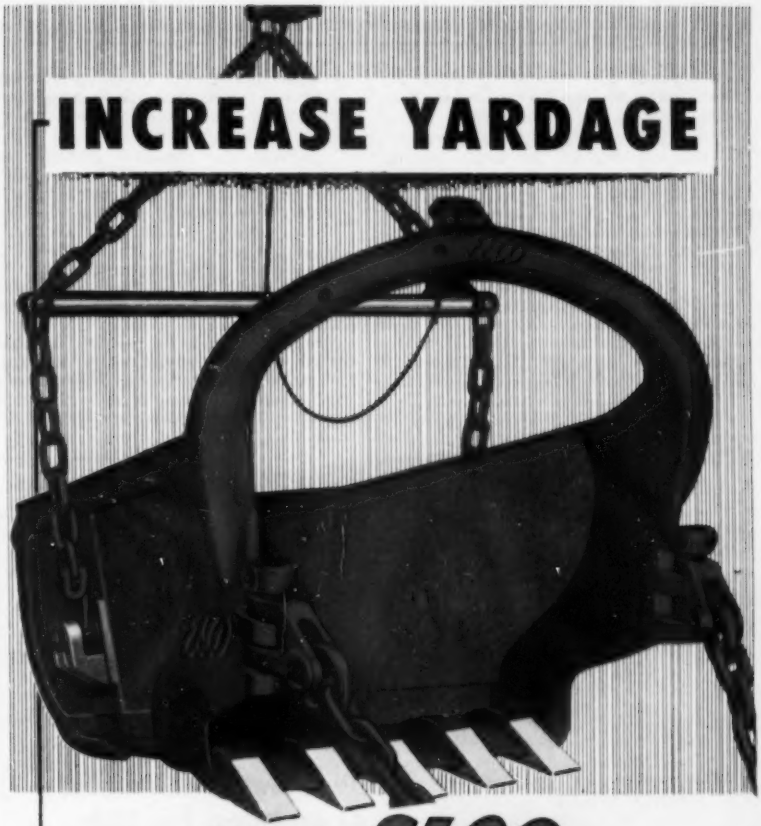
MEXICO—*Texas International Sulphur Company* of Houston, Texas has resumed core drilling on its concessions in the Isthmus of Tehuantepec, and reports additional commercial showings of sulphur. The firm holds concessions from the Mexican government covering 123,550 acres in the Isthmus.

COLOMBIA—Discovery of a large iron ore deposit about 28 miles from the site of the Acerias Paz del Rio steel mill is reported. According to preliminary reports, at least 75,000,000 tons of 45 to 50 percent iron ore are indicated both on surface and at depth. This will increase proven reserves for the steel mill, giving it an operating potential of 50 years rather than the previously estimated 18 years.

VENEZUELA—The Venezuelan Miners Association reports that the *Montecatini Company* of Italy has signed a contract with the Venezuelan government for the construction of a nitrogen and phosphate fertilizer plant. The plant will have an annual production of 30,000 tons of synthetic nitrogen which will be used to produce 80,000 tons of ammonium nitrate and ammonium sulphate. The plant will also produce 18,000 tons of urea and 20,000 tons of P_2O_5 from which 100,000 tons of superphosphates and nitric acid will be obtained.

BRAZIL—Monazite reserves in the state of Espirito Santo are estimated at between 115,000 and 170,000 tons. Most of these deposits exist in the southern part of the state where the veins do not rise to the high altitudes common in the north. Hundreds of thousands of tons were mined during World War II and for a period shortly afterward, and it is believed that the richest veins were depleted then. These contained up to 15 percent monazite, while recent discoveries contain between 1 and 2 percent monazite. Because of the importance of the mineral today, the National Department of Mineral Production has opened a technical office in Victoria equipped to investigate any potential showings.

CEYLON—Three mining companies whose identities have not been revealed are reportedly anxious to develop Ceylon's ilmenite deposits for future titanium production. These deposits are at present valued at about £22,500,000. The Minister of Industries has recommended to the government that the Ceylon public should have an opportunity for direct participation, and in his opinion the government should either divide the deposits among the three tenderers, or promote a public company in which the tenderers should have the right to participate but also including all available subscription



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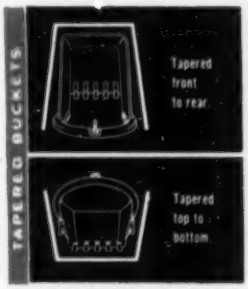

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applications. The Minister prefers the latter alternative but no decision has yet been made by the government.

INDIA—Work on increasing the productive capacity of the large thorium plant at Trombay has been completed, and the plant is in operation on the expanded basis. Several hundred tons of thorium and several tons of uranium are expected to be produced annually. Construction of the plant started in May 1953, and was completed in August 1955. Two months later the government decided to increase output by 30 percent above the rated capacity of the plant. At the same time, the Department of Atomic Energy decided to increase uranium output. The plant has been built entirely by Indian engineers, and a large portion of the equipment installed was made in India.

JAPAN—The *Nan-etsu* lead-zinc-copper mine in Niigata Prefecture which was purchased last year by *Toho Zinc Mining Company* is showing promising results already. The mine is located in Minami-uonuma-gun, Niigata, about 20 kilometers from Muyuka-machi, and was purchased from the *Nichiman Mining Company*. So far outcrop grade has shown 0.8 to 1.4 percent Cu; 5 to 8 percent Pb; and 10 percent Zn. Toho plans to continue exploration for about 1½ years. In the meantime, depending on exploration results, construction of a 5,000-ton-per-month mill is planned. This capacity would be doubled in about six years. Estimated cost is about $2,500,000.

SAUDI ARABIA—Nearly one-fourth of Saudi Arabia will be mapped by the *Aero Service Corporation*. The 200,000-square-mile survey covers the Shield Area which is believed to be potentially rich in minerals. The survey expenses are being paid wholly by the Saudi Arabian government. Completion is scheduled for 1957.

BURMA—The *Consolidated Tin Mines of Burma* have completed negotiations for a joint venture with the Burmese government. It is reported that the government will have 51 percent of the venture.

PAKISTAN—Alfried Krupp, head of Germany's famous steel firm, reports, after a visit in Pakistan, that he is very hopeful about the development of a steel industry in Pakistan. Mr. Krupp visited the site of the iron and steel plant to be set up by the *Pakistan Industrial Development Corporation* in association with the *Krupp* firm at Multan. He reports that their goal is 350,000 tons of steel per year, within two to three years. Initial production will be 70,000 tons per year. He reported, too, that the lack of coal was a hinderance, but that he was hopeful of the success of his own method of steel making which he calls the Krupp Renn process. He reported that the quality of iron ore in Pakistan was about the same as that of Germany—neither good nor bad. Iron ore found in Kalabagh and Chitral contained 35 to 45 percent iron.

MALAYA—*Lower Perak Tin Dredging Ltd.* recently completed a check drilling program which confirmed economic dredging reserves on the *Sungei Luas* mining leases owned by *Tanjong Tin Dredging Ltd.* As a result the Lower Perak company has paid Tanjong £300,000 for the leases.

JAPAN—The managing director of *Mitsui Mining & Smelting Company*, Takaya Watanabe, has been in India negotiating on zinc refining problems. The original plans of Metal Corporation of India for construction of a $5,555,555 zinc refinery reportedly have been indefinitely postponed because of finances. Therefore, Mitsui is seeking an increase in the amount of concentrate sent to Japan for smelting, from the present 3,000 tons monthly to between 5,000 and 6,000 tons.

ISRAEL—Equipment for the sulphuric acid leaching plant being erected by the *Israel Mining Corporation* at Wadi Timna is on its way to Israel. Production of copper-iron "cement" is expected to get underway within two years. Exploratory tunnels are currently being driven, but the plant is being established on the basis of an open-pit operation. The average content of the surface ore is estimated at 1.8 percent Cu. The site of King Solomon's ancient copper works is said to lie only a few hundred yards away—across the border in Jordan. The Israel Mining Corporation is a semi-governmental body in which the Israeli government has invested more than $7,000,000. The firm also mines phosphates and is prospecting for other minerals in the Negev.

PAKISTAN—*Pakistan Industrial Development Corporation* is planning to set up an iron and steel plant about seven miles from Multan City. An area of about 2,000

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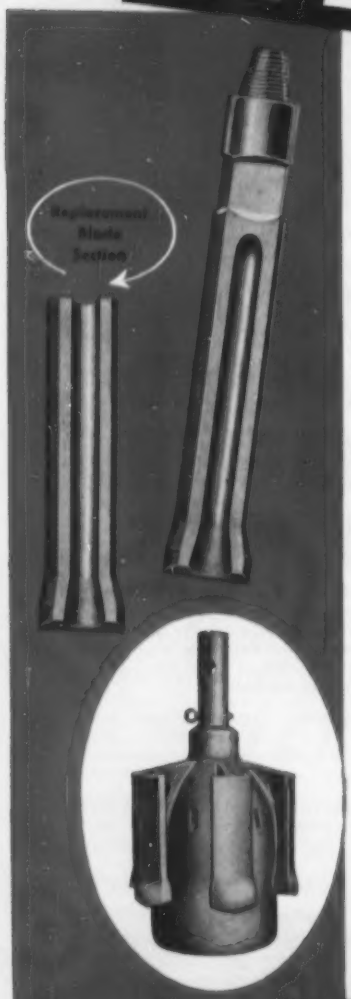

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UNION OF SOUTH AFRICA—*Titanium Corporation of S.A. Ltd.* has completed an agreement with *Anglo American Prospecting Company (Africa) Ltd.* for the latter to conduct a detailed investigation of Titanium Corporation's assets, including the producing deposits on the South Coast. (In 1955, Titanium exported 2,000 tons of ilmenite). Anglo American has a three-month option to acquire these assets for £250,000. If the option is exercised, a new company would be formed to acquire the properties; Titanium Corporation would be entitled to subscribe up to 10 percent of the initial capital in this new company.

MOROCCO—*Societe Nord Africaine du Plomb* and *Societe Algerienne du Zinc*, both 31.8 percent owned by *Newmont Mining Corporation*, report production of 172,756 metric tons of ore containing 15.0 percent zinc and 2.25 percent lead in 1955 from their operations near the Algerian-Morocco border south of Oujda, Morocco. Production in 1954 had been 158,388 tons of somewhat lower grade ore. An underground connection has been made between the present production shaft, N-3, and El Abed shaft, located about 6,900 feet to the east. While making this connection, eastward extension of the 1,800 feet of known ore "run" was proved for an additional 1,740 feet, which added materially to the ore reserves.

UNION OF SOUTH AFRICA—*Northern Investment Company Ltd.* which is developing the *Isitilo* chrome mine in Natal to a stage where 100 tons of ore can be mined daily, expects its concentrating plant to go into operation shortly. An output of about 1,500 tons of chromite concentrates per month is anticipated. The company has also acquired manganese ore deposits in the northern Transvaal where production is expected soon on a limited scale. Production of fluorspar is underway from a recently acquired fluorspar deposit in the western Transvaal. Development work is also going on at the company's copper deposit in the northern Transvaal and output of ore is expected soon.

CAMEROONS—The *Mayo-Darlé* tin deposit produced 180 tons of cassiterite in 1955, as compared with 117 in 1954. Gold output within the country continued to decrease, with 13 kilograms produced in 1955. Rutile operations which were shutdown in 1953 were resumed in 1955, and 100 tons of 95 percent TiO_2 have already been produced.

FRENCH WEST AFRICA—*Aluminium Ltd.* is considering plans for construction of an aluminum plant in French West Africa. Bauxite would be supplied by the firm's French mining subsidiary, *Bauxite du Midi*, which has been operating in French West Africa for a number of years. Representatives of Aluminium Ltd. and *Pechiney*, the leading French aluminum producer, have signed a joint statement of intent concerning the proposed project. Hydroelectric power from

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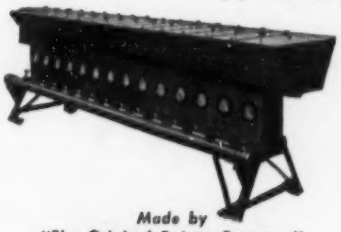

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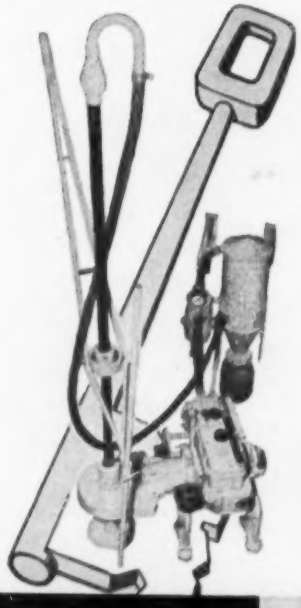

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FEDERATION OF RHODESIA & NYASALAND—*Central African Exploration and Mining Company (Private) Ltd.* has applied to the Mining Affairs Board for three exclusive prospecting reservations in the Hartly and Salisbury mining district. The areas cover 52%, 36%, and 31 square miles of country approximately 40 miles northwest of Gatooma, which will involve considerable expenditure. The applicants wish to seek and mine thorium, uranium, and any base metals discovered as a result of the exploration for thorium and uranium. Authority is sought to prospect on any registered base mineral block which may be within the proposed reservation. The Central African Exploration and Mining Company has been prospecting in the area for some time.

UNION OF SOUTH AFRICA—*Rustenburg Platinum Mines Ltd.* expects production of platinum in 1956 to be increased 50 percent over that of 1955 because of the expansion program being undertaken. The full effects of this program in terms of the output of refined platinum are expected to be attained during the first half of 1957. The quantity of metals available for disposal will materially increase in the 1956/1957 year. The existing mining and hoisting capacity is presently adequate for the requirements of the new expansion program, but further shaft sinking will be started within 12 months to provide for future requirements. Reduction plant, smelter, and matte smelting capacity at Rustenburg will be increased. The mining areas presently available provide for a reasonably long life on current production rates, but steps are being taken to increase these areas to an extent ensuring many years of operation at higher levels.

FEDERATION OF RHODESIA & NYASALAND—The *American Metal Company* is reported to have completed a $1,000,000 transaction with *Wheedon Minerals* for control of its manganese deposit 10 miles west of Fort Roseberry, covering a distance of 20 miles. The negotiations were completed through the *Rhodesian Vanadium Corporation*.

SOUTH WEST AFRICA—*South West Africa Company Ltd.'s* property at Berg Aukas, Harasib, and Baltika is being thoroughly investigated, but at this stage it is not possible to estimate possible vanadium ore reserves. The situation appears promising, however. Meanwhile, tungsten output is expanding despite difficult working conditions. At the *Abenab West* mine, conditions are not so promising because the vanadium content of the ore is diminishing; in order to make up some of the loss, a new plant is being erected to treat lead and zinc sulphide ores. During the three-month period ended December 31, 1955, the Abenab West mine produced 1,694 tons of concentrate, containing 716 tons of lead and 244 tons of vanadium pentoxide, which compares with 696 tons of lead and 240 tons of vanadium during the preceding three-month period. The company's *Berg Aukas* mine produced 92 tons of lead and 38 tons of vanadium pentoxide in those three months; it had not produced anything in the preceding three months. *Brandberg West* produced 34 tons of tin and 13 tons of tungstic oxide which compares with 34.5 tons of tin and 15 tons of oxide in the preceding quarter.

NIGERIA—An offer to purchase the property of *South Bukeru Areas Ltd.* has been made by *The Bisichi Tin Company (Nigeria) Ltd.* excluding buildings, plant, machinery, mining stores, etc. This development is a direct result of the collapse of the columbite market.

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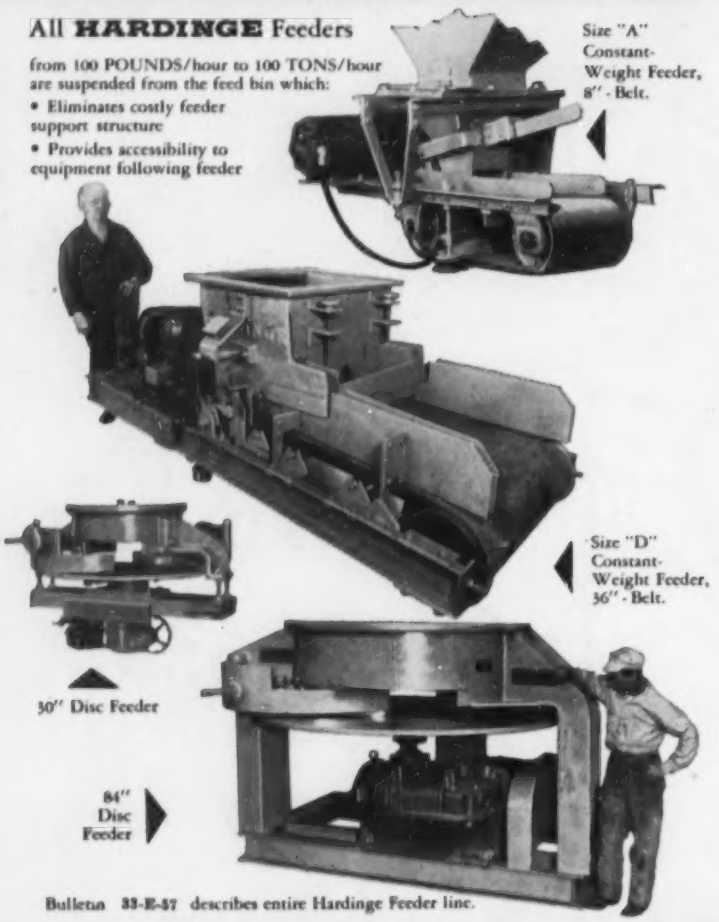

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ALASKA—*DeCoursey-Brewis Minerals* started operation of its new decovery plant at the *Red Devil* mercury mine 250 miles west of Anchorage on February 27. After a brief tune-up period, the first 50 flasks were shipped on March 15. Ore grade has been revised upward to approximately 39 pounds of mercury recovered from one ton of ore. The firm has a contract to sell its first 1,500 flasks at $255.00 per flask, f.o.b. Seattle, to be delivered by August 1, 1956. Underground work during the past year has consisted of sinking 150 feet and establishing a third level. About 1,500 feet of crosscut and drifts were driven on this level, raises were driven to the 200 level, and from there to old workings which had been opened through an adit.

QUEBEC—*Noranda Mines Ltd.* plans to increase capacity of its copper smelter by an additional 50 percent; it presently handles about 2,000 tons of charge daily. About 800 tons come from the company's *Horne* mine. The expansion is said to reflect an increase in copper concentrates from custom shippers. It is hoped that the expansion can be completed by late in 1957.

ONTARIO—The *Foundation Company of Canada* has received a contract for construction of the crushing, milling, and agglomerating plants to be erected at the *Hilton* mine 40 miles northwest of Ottawa. *The Hilton Mines* is owned 50 percent by the *Steel Company of Canada* through its subsidiary *Stelco Mines Quebec*, and 50 percent by *Bristol Quebec Mining Company* which, in turn is owned by *Jones & Laughlin Steel Corporation* and *Pickands Mather & Co.* About $16,000,000 will be required to bring the property into production. An annual production of 600,000 tons of pellets annually with a high iron content is planned. The Hilton mine, incidentally, has been renamed in honor of Hugh G. Hilton, president of the Steel Company of Canada. It was formerly named the *Bristol*. H. G. Gerber of Pickands Mather & Co. will be superintendent in charge.

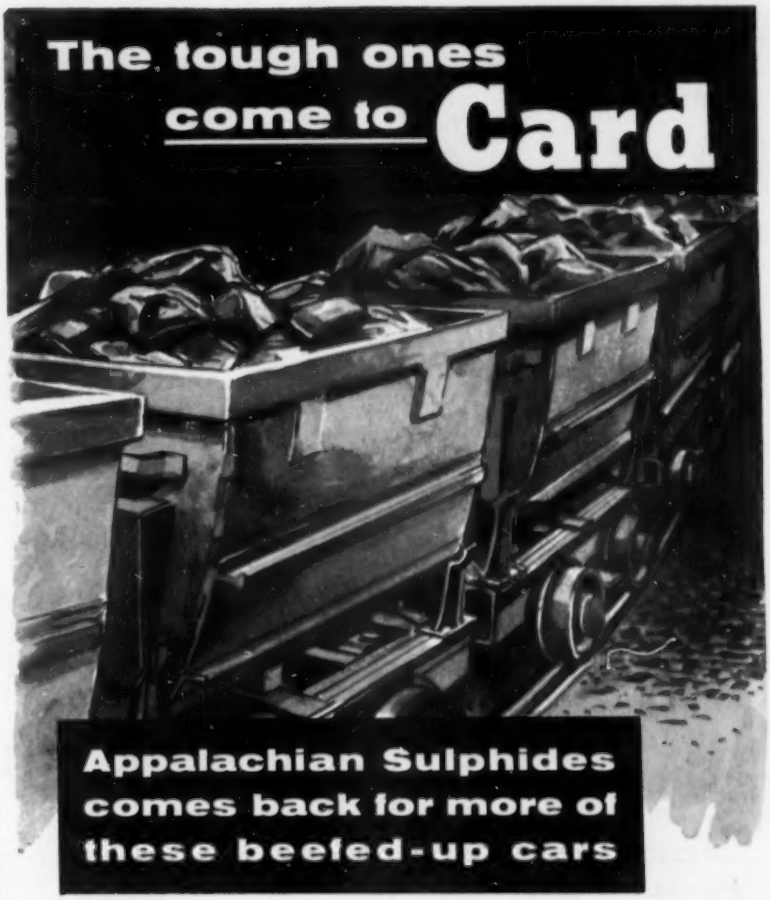
BRITISH COLUMBIA—Driving of a 21-mile tunnel in northern British Columbia is under consideration by *Granduc Mines, Ltd.* The long bore would extend from tidewater through towering coastal ranges to tap more than 25,000,000 tons of copper ore. A 45-mile proposed railway has been rejected as unfeasible because of ice which covers 70 percent of the route. Granduc is owned jointly by *Granby Consolidated Mining Company* and *Newmont Mining Corporation*.

ALASKA—*Northwest Ventures Ltd.* of Vancouver is diamond drilling its 49 copper claims on Gravina Island near Ketchikan. *Bornite Copper Corporation* reportedly is negotiating for a 50 percent interest in the group.

ONTARIO—*Dravo of Canada Ltd.* has started shaft sinking operations on a new production-size shaft for *Faraday Uranium Mines* near Bancroft, Ontario. The shaft, Faraday's No. 1, will have three compartments and will be sunk to a depth 1,050 feet below the adit level. The contract also calls for six standard shaft stations, two pumping stations, and a loading and spill pocket. A mine surface plant and mill will be designed to process 750 daily tons initially, but provision is being made for expansion to 1,000 tons when necessary. The mill and plant are expected to be in operation early in 1957 and operating at initial capacity by July 1.

GREENLAND—*Nordic Mining Company Ltd.* is reported to have signed a seven-year contract with a Danish shipping line (J. Lauritzen) for the export of 120,000 metric tons of lead and zinc concentrates to the United States and Europe. The concentrates will come from the mine and mill at Mestersvig which has gone into production.

BRITISH COLUMBIA—*Copper Leaf Mines Ltd.*, which has been rehabilitating the old *Eureka* mine southwest of Nelson for several years, has purchased the former *Kenville Gold Mines'* mill near Taghum. The company plans to mill 200 tons of Eureka ore daily, and to ship copper



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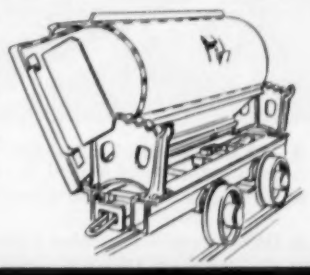

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concentrates to the ASARCO smelter at Tacoma, Washington. An estimated 80,000 tons of ore is blocked out in the mine, which last produced 37 years ago. Dr. Frank C. Buckland of Vancouver is president.

ONTARIO—*Standard Ore and Alloys Corporation* of New York and *Frobisher Limited* announce that, together with two other firms, they are jointly interested in 72 mining claims in the Sault St. Marie region. An aerial survey has indicated the possibility of a multi-million ton iron ore body, and drill teams have been sent out to determine size and grade of the deposit.

ALASKA—A recent court decision in the case of Flynn vs. Vevelstad was made in favor of Mr. Flynn who will now proceed with plans for exploration of the disputed Yakobi Island nickel claims.

QUEBEC—Shipments from the *Iron Ore Company of Canada's* operations on the Quebec-Labrador border totaled more than 7,700,000 tons in 1955. This was the project's first full year of operation. In 1956 output is expected to exceed 12,000,000 tons.

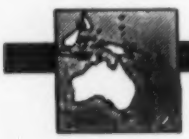
ONTARIO—Stockholders have voted unanimous approval of a merger of *Blue Rock Cerium Mines* and *Rare Earth Mining Corporation* on a share-for-share basis. The new firm will be called *Rare Earth Corporation of Canada*. The two companies hold adjoining uranium properties in the Bancroft-Haliburton area. A large mill to handle custom ores is planned. Underground work at the firms' individual properties is proceeding on schedule.

BRITISH COLUMBIA—*Utah Company of The Americas* is currently drilling a magnetite property on Porcher Island about 20 miles southeast of Prince Rupert. The claims were acquired from George Royles in a 20-year lease on a royalty basis. Mr. Royles also holds another magnetite deposit at Stuart Anchorage on Pitt Island, and Utah Company is reported to be investigating the possibility of conducting work there as well.

QUEBEC—*Eastern Asbestos Company* is planning construction of a mill at its *Notre Dame de la Salette* property where diamond drilling has indicated substantial reserves. The mill will be producing about 200 tons per day, but will be designed for easy expansion to 400 or 500 tons if warranted.

NORTHWEST TERRITORIES—*Callahan Zinc-Lead Company* is reported to have filed jointly with *Pardee Amalgamated Mines* on 500 mining claims in the new Windy Point lead-zinc district on the northwest shore of Great Slave Lake.

ALASKA—Equipment has been installed by the U.S. Bureau of Mines at Juneau to test uranium ore samples. Address is Box 560, Juneau. Secretary of the Interior Douglas McKay said that the decision to provide the free service to prospectors was based on the fact that several uranium finds had been made recently in southeastern Alaska. This station brings to 11 the number of Bureau laboratories to which the public can send samples for radioactivity tests. All such examinations are conducted under a cooperative arrangement with the United States Atomic Energy Commission.



NORTHERN TERRITORY — The United Kingdom Atomic Energy Authority has offered to purchase a substantial portion of its uranium oxide requirements from the South Alligator River area, subject to the proving of the necessary amount of ore by December 31, 1957. This gives companies in the area an opportunity to sell on satisfactory terms the greater part of their anticipated output and enables advance planning. The Commonwealth government and the Australian Atomic Energy Commission are

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studying a proposal that ore already proved should be purchased for stockpiling. This would enable companies to turn proved ore into cash, which is rapidly becoming their most important consideration after spending large sums on exploration and development.

REPUBLIC OF THE PHILIPPINES—The *Hixbar Mining Company* has signed a contract with the *Engineering Equipment and Supply Company* for construction of a 275-ton-daily mill. The mill will be erected at the site of the *Hixbar* copper and iron sulphide mine on Rapu Rapu Island, Albay. The mine has been under rehabilitation since the end of World War II, and company officials report that substantial ore bodies have been developed to insure operation for some time to come. The new mill will facilitate production of both iron sulphide concentrates needed in manufacture of fertilizer, and copper concentrates. Completion is expected within about nine months.

WESTERN AUSTRALIA—*Western Uranium Mines N.L.*, following drilling and exploration work at Ravensthorpe, is giving serious consideration to a treatment plant for 5,000 tons of copper ore monthly. This would be a preliminary step in any plans to open the Ravensthorpe field on a large scale. Although the company has reported no important uranium discoveries, the copper find is an important outcome of the uranium exploration program.

INDONESIA—Toshio Ishikawa, manager of the *Tekkosha Company Ltd.* of Japan, together with the chairman of the managing directors of the *Indonesian Mining Exploration Company*, Mr. Notosurota, paid a recent visit to the head of the Bureau of Mines. Mr. Ishikawa declared that his firm is using a greater part of Indonesian manganese, which is found to be of better quality than Indian manganese. According to Mr. Ishikawa, if regular shipments could be worked out his firm would buy exclusively from Indonesia. As soon as the new mining law and the law on foreign investments are ready, his firm shall cooperate with Indonesian Mining Exploration Company in developing Indonesian mines. At present, Tekkosha Company is sending only light machinery for one of the Indonesian Mining Exploration Company's manganese mines.

REPUBLIC OF THE PHILIPPINES—The base metal producers have joined the gold producers in attempting to have Congress extend the gold mining subsidy due to expire in June. Also proposed is that base metal producers who turn out gold as a byproduct would also be entitled to a subsidy. *Lepanto Consolidated Mining Company*, for example, one of the country's two major copper producers, also produces more gold monthly than some of the regular gold mines. An increase has also been suggested which would raise the rate for marginal mines from Pesos 111.72 to Pesos 116.00 per ounce, and for non-marginal mines from Pesos 105.40 to Pesos 109.00 per ounce. Mines would be required to sell half of their output to the government and would have permission to sell all of it to the government if they could not obtain a better price on the open market.

WESTERN AUTRALIA—*Australian Blue Asbestos Ltd.* at Wittenoom has received firm orders from the United States and Europe for 7,000 tons of crocoidolite in 1956. Price is about £100 per ton. The firm hopes for orders on an additional 1,000 tons, thus guaranteeing the year's output. Production costs have been reduced during the last two years but having to sell the product abroad places the industry at a disadvantage (local consumers of asbestos continue to prefer cheaper grades). Costs can be reduced still further if more orders are received and output can be expanded. The next few years will continue to be critical for the industry which is of value in developing an arid region of Australia.

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Grab Samples

Continued from page 3

the granodioritic minerals, chiefly of the albite and the quartz. The matrix from which they are formed is often a more or less ferriferous dolomite. The prospectings of Durba show that the magnetite quartzites (itabirites) found on top of the layers do not exist in depth where these same layers become gradually an ankeritic dolomite.

Up to the present, it may be assumed that most of the quartz veins of all the Kilo-Moto gold fields vanish at a relatively slight depth.

In admitting simply the hydrothermal character of the Kibalian rocks, the granodiorites and the granites of the peripheric zones, this expression should be understood in a singularly enlarged sense, because the rocks are subject to strange surface alterations. Mr. R. Woodtli has demonstrated, e.g., that the schistosity of Kibali may be a superficial phenomenon, produced by weathering which consists in a phyllitization, and which extends itself rarely under the hydrostatic level. The part played by the phenomenons properly eruptive, apart from dykes and floats of recent dolerites (plio-pleistocen), would be very effaced.

It is certain that extrusive phenomenons have occurred in the Kibalian formation, but they may not have the amplitude which is attributed to them on basis of the fragmentary observations made in the past.

The latest results, referring to a numerous ensemble of deep borings of about 200 to 350 meters and very close together, show that no other judgment but a chemical analysis permits the demarcation of the limits of the auriferous part of the rocks of Gorumbwa and Agbrabo. The separation between the rich zone and the barren one is nevertheless always clear.

Consequently, the idea of auriferous veins based on a magmatic hypothesis can become a misleading assumption when prospecting. A unique explanation could be that of a (hydrothermal) concentration in some zones of more active circulation of the water. When there are veins, especially consisting of quartz in a mass of schists (such as at Senzere), it may be understood that the water circulates better through veins than in less permeable rocks. But even there it is not an absolute rule, as it is proved by gold plates found at Maranga, lying in foliated schists.

The basis for investigations may therefore be determined in ducking the structures, veins, shear zones, etc., where the selective circulation of water is of preponderant importance.

R. Vermeylen
Le Secretaire General
Societe Des Mines D' Or De Kilo Moto
Brussels, Belgium

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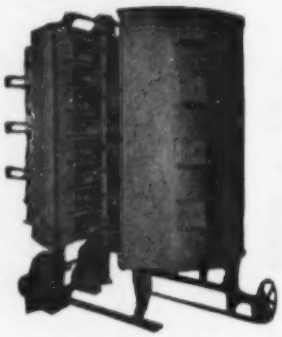

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Aerofall Mill

Continued from page 52

the fineness of the grind in the standard equipment mentioned above. At a grind of 56.1 percent minus-200-mesh in the same equipment, the recovery was reduced only 2.0 percent to 77, against 79 at the finer grind. At a grind of 76 percent minus-200-mesh in the Aerofall equipment, the recovery was reduced to 83.6 percent against 88.5 mentioned above. The opinion of the Aerofall company is that a coarser grind in the Aerofall equipment than 60.4 percent minus-200-mesh may have given a further increase in recovery.

The beneficial influence of the "clean" dry-grind product from the Aerofall circuit on reagent consumption has already been mentioned.

Comparative Gold U_3O_8 Recovery

By the end of 1955, 19 mines—designated as gold-uranium producers—were in production. Another four are expected to reach the stage of production this year. Others may be declared gold-uranium producers in due course. The question therefore arises whether replacement of current standard equipment by Aerofall equipment would be an economic consideration, even before the elapsing of the normal period of amortization. The Aerofall company answers this question as follows:

The cost of reduction to a grind of 80 percent minus-200-mesh amounts to 3.1 Shillings a ton with current standard equipment, and 1.2 a ton with Aerofall equipment. The saving is therefore 1.9 Shillings a ton, to which is added 1.0 for reduced acid consumption, 2.0 for improved gold recovery, (see the East Daggafontein test results) 1.5 for increased uranium recovery: in all, 6.4 Shillings a ton.

These benefits are then projected against the replacements of relevant current standard equipment by Aerofall equipment in—first, a 100,000 ton-a-month plant; and second, a 140,000 ton-a-month plant. In respect of the first plant, the reclaim value of the standard equipment except the retained part of the secondary grinding and thickening circuits is estimated at £50,000. This is set against the outlay of £340,000 for new Aerofall equipment which would be used in conjunction with the retained equipment mentioned, making the net outlay £290,000. Reducing the benefits mentioned in the preceding paragraph from 6.4 to 5.0 Shillings a ton, the amortization of the new net capital outlay would be effected within 12 months. In respect of the second plant, the reclaim value of plant corresponding to that in the first example is estimated at £60,000: this reduces the new capital outlay for Aerofall equipment from £545,000 to £485,000, making the amortization period about 14 months.

Free State Gold U_3O_8 Ores

Free State gold-uranium ores have been given special attention in the application of Aerofall equipment to South African practice. In these ores, the mineral constituents are known to be more finely disseminated than in most Rand ores. The operating data in Table No. X have been derived for 2-stage grinding, the primary stage handling run-of-mine ore and incorporating Aerofall mills and the secondary stage incorporating slow-speed ball mills. Both stages incorporate closed-circuit classification in cyclones.

MINING WORLD and its Johannesburg correspondent—L. A. Waspe—thank African Aerofall (Pty.) Ltd., Johannesburg, and its chairman—Mr. D. Weston; as well as the head office of Anglo American Corporation of South Africa Ltd., and the management of East Daggafontein Mines Ltd. for providing the opportunity that made possible the publication of this article and photographs.

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☐ **COPPER** *edited by Allison Butts.* Treats almost every phase of the chemistry and metallurgy of copper, its alloys and compounds. Full chapters describe copper minerals and ore deposits; smelting, converting and refining; melting and casting; physical and chemical properties; hot and cold working; binary and ternary copper alloys; and uses of the element in chemistry, biology and agronomy. ACS Monograph, 1954. $20.00

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U.S.A. Metal & Mineral Prices

METALS

		April 20, 1956
COPPER:	**Electrolytic.** Delivered F.o.b. cars, Valley basis	46.00¢
	Lake. Delivered, destinations, U.S.A.	46.00¢
LEAD:	**Foreign** Copper, Valley basis	46.00¢
	Common Grade. New York	16.00¢
ZINC:	**Tri-State Concentrates,** jig, flotation 80% lead, per ton	$201.75
	Prime Western: F.o.b. E. St. Louis	13.50¢
	Prime Western; Delivered, New York	14.00¢
ALUMINUM:	**Tri-State Concentrate,** 60% zinc, per ton	$89.00
ANTIMONY:	**Primary 30 Pound Ingots (99% plus).** F.o.b. shipping points	25.90¢
BISMUTH:	**Lone Star Brand.** F.o.b. Laredo, in bulk	33.50¢
CADMIUM	(In ton lots) price per pound	$2.25
COBALT:	**Sticks and bars.** 1 to 5 ton lots (Price per pound)	$1.70
COLUMBIUM:	**97-99%,** keg of 550 pounds (Price per pound)	$2.60
LITHIUM:	**Powder** Nom., per pound	$119.25
MAGNESIUM:	98% (per pound)	$11.00-$14.00
MERCURY:	**Ingots (99.8%)** F.o.b. Velasco, Texas, per pound	34.50¢
NICKEL:	**Flasks.** Small lots, New York	$265.00-$268.00
SELENIUM:	**"P" Ingots (5 pounds).** F.o.b. refinery, Port Colbourne, Ontario	64.50¢
THORIUM:	**99.5%,** per pound	$13.50-$15.50
TIN:	**per kilogram:**	$43.00
TITANIUM:	**Grade A. Brands.** New York (Price per pound) Prompt delivery	99.50¢
URANIUM	**99.3%** + Grade "A" (Price per pound)	$3.15-$3.45
U-235:	**Nominal, per kilogram**	$40.00
GOLD:	**Nominal,** per kilogram	$11,000.00
SILVER:	**United States Treasury Price**	$35.00 per ounce
	Newly mined domestic. United States Treasury price	90.50¢ per ounce
	Foreign Handy Harmon	91¢
PLATINUM:	**Per Ounce**	$97.00-$107.00
ZIRCONIUM:	**Sponge, Per Pound**	$10.00

ORES AND CONCENTRATES

BERYLLIUM ORE:	**10 to 12% BeO. F.o.b. mine,** Colorado	$47.00 per unit
	Small lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at $400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, $40 per unit; 9.0 to 9.9%, $45; over 10.0%, $50.	
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.	
	African (Rhodesian). 48% Cr_2O_3. 3 to 1 Ratio	$44.00-$45.00
	African (Transvaal). 48% Cr_2O_3. No Ratio	$31.00-$32.00
	Turkish, 48% Cr_2O_3. 3 to 1 chrome-iron ratio	$52.00
	U. S. Government ore purchase depot Grants Pass, Oregon, Base price, lumpy ore, $115.00; fines and concentrates $110.00 for 48% Cr_2O_3 and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr_2O_3.	
COLUMBIUM-TANTALUM ORE:	At United States small lot beryl purchase depots. $3.40 per pound contained combined pentoxides in 50% ore. Includes 100% bonus. (Government stopped buying temporarily May 12)	
IRON ORE:	**Lake Superior. Per gross ton Lower Lake Ports**	
	Mesabi, Non Bessemer, 51.5% Fe.	$10.85
	Mesabi, Bessemer, 51.5% Fe.	$11.00
	Old Range Non Bessemer.	$11.10
	Old Range Bessemer.	$11.25
MANGANESE ORE:	**Swedish,** Atlantic Ports, 60 to 68% Fe. Contracts, Per Unit	22.00¢
	Metallurgical grade. 48 to 50% Mn. Long ton unit	$1.25
	Metallurgical grade. 46 to 48% Mn. Long ton unit	$1.15
	Metallurgical grade. 45 to 46% Mn. Long ton unit	$0.95
	Chemical grade. 80% MnO_2. Per Ton	$70.00
	Domestic U. S. Government are purchasing depots: Butte, Montana; (black and pink ores) base price of $4.87 per long dry ton of 18% manganese ore. Phillipsburg, Montana; base price of $6.43 per long ton unit of 15% manganese ore. Small lot program f.o.b. railroad cars, minimum 40%, Mn. Base price (48%) $2.30 per unit with premiums and penalties.	
MOLYBDENUM CONCENTRATE:	**90% MoS_2 F.o.b. Climax, Colorado. Per pound of contained** molybdenum, plus cost of containers	$1.10
TUNGSTEN CONCENTRATE:	**Domestic.** 60% WO_3 Per short ton unit	$63.00
	Foreign. 65% WO_3 Per short ton unit (Scheelite)	$34.00
	Foreign. South American, Spanish, Portuguese	$33.00
URANIUM ORE:	**Carnotite-Rossoelite.** F.o.b. purchase depot plus $0.06 per ton mile ($6.00 maximum), Grand Junction, Rifle, Durango, Naturita and Uravan, Colorado Salt Lake City, Marysvale, Thompsons, Moab, White Canyon, Green River, and Monticello, Utah, Shiprock, and Bluewater, New Mexico, Edgemont, S. Dakota, Riverton, Wyoming, Tuba City, and Cutter, Arizona. Base price for 0.10% ore is $1.50 per pound and up to $3.50 per pound of contained U_3O_8 plus $0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of $0.25 per pound for each in excess of 10 pounds. A $0.50 per pound development allowance paid on all ore purchases. Special lime schedule applies at Monticello and Moab. No lime penalty with no vanadium payment or lime penalty with vanadium payment.	
VANADIUM ORE:	**Carnotite-Rossoelite.** V_2O_5 **in ratio of more than 10 parts to 1 part of U_3O_8 are generally acceptable at all AEC depots. but excess not paid for at Marysvale,** Monticello, and Bluewater-Shiprock has no limit on V_2O_5 to U_3O_8 ratio and all contained V_2O_5 is paid for Per Pound V_2O_5	$0.31

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	Oil Well grade. Packed in 100 pound paper bags	$14.00
FLUORSPAR:	**Metallurgical grade. 70% effective CaF_2 content per short ton F.o.b.** Illinois-Kentucky mines	$32.00-$35.00
	Mexican. 70% f.o.b. border	$24.00-$24.50
	European, Atlantic Ports, 70%	$33.00-$34.00
	Acid Grade. 97% CaF_2 F.o.b. Kentucky, Illinois, Colorado	$47.50-$50.00
PERLITE:	**Crude: F.o.b. mine per short ton**	$3.00 to $5.00
	Plaster grades. Crushed and sized. F.o.b. plants	$7.00 to $9.00
SULPHUR:	Long ton, F.o.b. Haskins Mound, Texas	$25.50
	Export	$30.50

LONDON METAL AND MINERAL PRICES

		Per Long Ton		April 20, 1956 USA Equivalent cents per pound[1]
COPPER:	**Electrolytic spot**	£380	0s 0d	47.50¢
LEAD:	**Refined 99%**	£115	5s 0d	14.41¢
ZINC:	**Virgin, 98%**	£99	0s 0d	12.37¢
ALUMINUM:	**Ingot, 99.5%**	£189	0s 0d	23.625¢
ANTIMONY:	**Regulus, 99.6%**	£210	0s 0d	26.25¢
TIN:	**Standard, 99.75%**	£767	10s 0d	95.94¢
TUNGSTEN:	**Long ton unit, 2625**	$36.68 per long ton unit		

1. With Sterling pound at $2.80.

Quotations on metals and certain ores through the courtesy of *American Metal Market,* New York, N. Y.

Obituaries

Daniel C. Jackling, 86, internationally known for his development of methods for mass mining and milling low-grade copper ore, died at Woodside, California, in March. Both mining engineer and industrialist, Mr. Jackling founded the Utah Copper Company in 1903 where he initiated his revolutionary copper mining methods. These methods now produce more than 60 percent of the world's copper. When he retired in 1942, Mr. Jackling was in charge of all western holdings of the Kennecott Copper Corporation's mining interests, and a stockholder and director in many other large corporations, including Butte & Superior Mining Company, Alaska Gold Mines Company, American Zinc, Lead & Smelting Company, and Mesabi Iron Company.

Heath McClung Steele died in New York City on February 21, 1956 at the age of 71. He became associated with J. R. Finlay in 1911 as consulting engineer, with headquarters in New York. In 1917 Mr. Steele joined The American Metal Company, Limited and soon afterwards took charge of its Mexican operations. In 1923 he became a director of the company and in 1930 was elected vice president. He was primarily responsible for the inception of the Metal Company's potash enterprise at Carlsbad, New Mexico, and the exploration program which led to the discovery in 1954 of the lead-zinc-copper-silver orebodies in New Brunswick, Canada, which have since been named in Mr. Steele's honor.

By his imaginative leadership Mr. Steele contributed substantially to the growth of the Metal Company during the period of his connection with it. He played a large part in the evolution of the Company's operations in Mexico and of its copper and by-product refinery at Carteret, New Jersey. Mainly on his initiative occurred the development of the Pecos Mine, owned jointly by the Metal Company and David M. Goodrich and associates, which became a large producer of zinc and lead during the 1920's and 1930's.

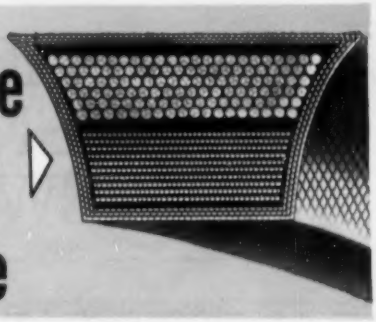
An Appreciation by
HAROLD K. HOCHSCHILD

Marden W. Hayward, mining geologist par excellence, officially known as "Doc" to his legion of friends, died on February 4, 1956 at his home in El Paso, Texas. He was 73.

Commencing his career as geologist for the firm of Spurr & Cox, he joined the staff of The American Metal Company, Limited in 1915. His contribution to geology and mining was steadily and modestly made throughout his long and active career. His early work in Mexico, particularly on the occurrence of lead-zinc ores in dolomitic limestones, contributed measurably to the science of geology. Better known in the mining world is the important part which Mr. Hayward played in the development of the Climax molybdenum ore deposit, Colorado, and the copper deposits at Minas de Matahambre, Cuba.

An Appreciation by
His Associates

Why this curve lengthens V-belt life



THE CONCAVE SIDES (U.S. Patent 1813698) of every Gates V-Belt are a precisely engineered curve. This curve greatly lengthens V-belt life for this interesting reason:

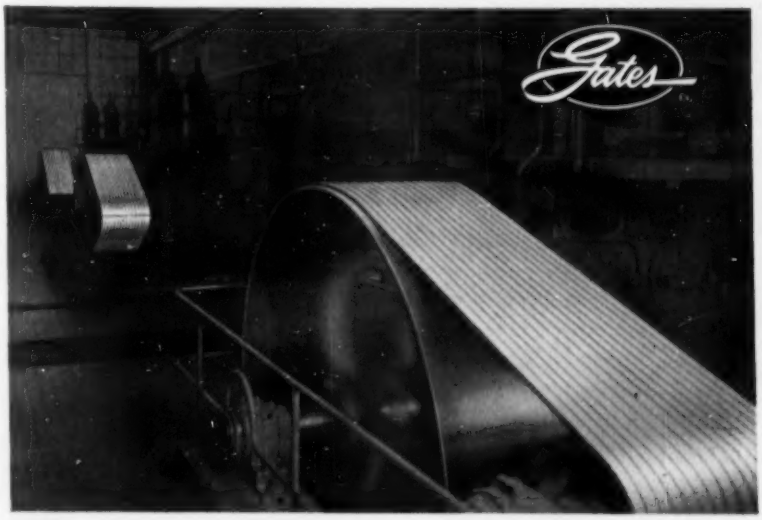
When you bend a Gates V-Belt, just as it is bent around a sheave, the concave sides (Fig. 1) become straight. Therefore, the belt makes full contact with the sheave, gripping the sides evenly (Fig. 1-A) and wear is distributed uniformly across the sidewalls of the belt. Naturally, uniform wear lengthens belt life; saves on replacement costs and cuts down-time.

Now see what happens when you bend a straight-sided belt. (Fig. 2) Just feel the sidewalls *bulge out* at the bend. The bulge causes *uneven* contact with the pulley, as in Fig. 2-A. And uneven contact causes excessive wear at points shown by arrows; belt life is shortened.

Cut costs by getting longer wear from your V-belt drives. Specify Gates Vulco Rope—the V-belt with concave sides. Your nearby Gates distributor will supply your needs promptly. The Gates Rubber Co.—*World's Largest Maker of V-belts.*

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA-74



Gates VULCO ROPE Drives

PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill or smelter. This PEP section is MINING WORLD's way of making available to you some of the finest current information on mechanization.

Ore & Chemical Company Offers New Testing Service

The Ore & Chemical Company now offers facilities for ore testing by use of the new OCC Separatory Vessel, capable of testing quantities of ore from three tons to fifty tons per hour. The company offers the testing service by the OCC process to responsible organizations. Mining concerns desiring testing on either laboratory or full scale commercial basis should contact the Ore & Chemical Company, 80 Broad Street, New York City. Ore & Chemical also offers facilities of a Heavy Liquid laboratory capable of handling ore samples of 20 pounds or more. These laboratory facilities are available in conjunction with the HMS testing plant, located at White Haven, Pennsylvania. For further information on this service circle No. 69.

Electric Truck For Underground Hauling

An electrically-powered earthmover truck for underground hauling has been designed and manufactured by the Kenworth Motor Truck Company. Known as the 802-E, it is the newest design in Kenworth's custom-built earthmover series.

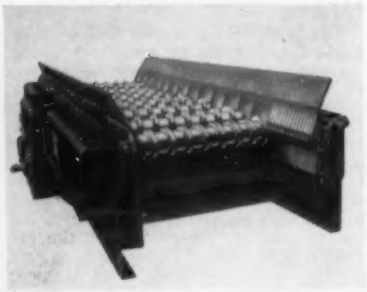
Powered by electric traction motors, the unusual end-dump truck receives current from overhead wires through a trolley. The truck also is equipped with a cable reel so the operator can maneuver away from the overhead wire zone.

Capacity of the new Kenworth is 16 cubic yards struck, or 24 tons. The heaped load capacity is 19 cubic yards. Gross vehicle weight rating is 93,000 pounds. Circle No. 73 for more information on this unusual truck.

New Ventilation Tubing Available From Norway

A new ventilation tubing produced by Fagertun Fabrikler A-S, Drammen, Norway, is now available in the United States. Called Ventiflex, the tubing is made from jute textile, treated against rot and coated on both sides with Polyvinyl Chloride providing a smooth surface with little friction resistance for the passing air. Ventiflex is fireproof, and has a high resistance against oils, gasoline, chemicals, and copper waters. According to the manufacturer the tubing is not affected by sunlight, and has excellent abrasion strength.

Rips and tears are easily repaired with a newly developed patching compound and patch provided by the manufacturer. Numerous accessories such as 15° and 30° bends, conical nozzles for directing airstream, etc., are also available. Circle No. 71 for additional information.



Wobbler Feeder Feeds and Scalps In One Operation

Universal Engineering Corporation, manufacturers of crushing, screening, washing, loading, and conveying equipment, announces a new type feeder for heavy-duty quarrying and mining operations.

Called the "Wobbler" feeder, the machine performs feeding and scalping functions in one operation, supplanting in many operations the conventional feeder-screen combination. Patented elliptical bars of manganese steel form the bed of the feeder, and by alternate horizontal and vertical positioning impart a rocking and tumbling motion to materials. "Wobbler" action causes fines to be extruded through the bed to a conveyor belt as the oversize is cleaned of adhering material and fed to trucks or directly to crusher. Circle No. 76 for brochure.

Reverse Riffle Saves Water On Dunham Table

The reverse riffle is only one of the outstanding features to be found in the Gordon S. Dunham Economy Concentrating Table. Similar to the Hungarian type riffle, the reverse riffle prevents packing of the feed thus cutting down the consumption of water. The riffles are milled out of the deck itself. By doing this an absolute feather edge is obtained, a feature which is hard to find on riffles that are tacked to the deck of a table.

The 4-by 12-foot concentrator is known for its excellent recovery of slimes, and low water concentration. Excellent recoveries are being made with such friable, slime producing material as scheelite. Capacity of the table is up to one tone per hour, with a water to feed ratio of only 1:1. For further information and brochure circle No. 66.

DIESEL POWER, stationary, portable, or mobile is available from the A. G. Schoonmaker Company, Inc. New or remanufactured units are available ranging from 10 KW to 1500 KW continuous or standby service. AGSCO engineered units may be found throughout the world. Circle No. 1 for further information.

ALLOY STEEL JAR: The Spang weldless alloy-steel Jar drills up to four times more footage, with fewer fishing jobs. Spang has recently released a complete cable tool data catalogue describing their jars and other drilling tools. For your copy write to Spang & Co., Butler, Pennsylvania, or circle No. 2.

PORTABLE CRUSHING PLANTS: The Gruendler Crusher and Pulverizer Co., St. Louis, Mo., now has available a complete line of portable crushing plants and accessories. Models are available from 5 to 50-hp, mounted on steel or pneumatic tires, on rugged frames with two or four wheels. Units are available with attached trommel screens or conveyors. Send for your free catalog, circle No. 3.

PLASTIC TAMPING STICK: Having trouble loading high back holes? According to the Plastic Tamping Stick Sales Co., your troubles are now over. The company has recently developed a new type plastic tamping stick which is able to hold on to a stick of powder, prior to loading. Circle No. 4 for further information.

A NEW LINE OF SCREENS called Wissco-loy Space Screens is fully described in a new booklet offered by the Colorado Fuel and Iron Corp. The fully-illustrated bulletin includes a complete listing of standard specifications as well as recommended applications and suggestions as to ordering. Circle No. 5 for your copy.

FOUR-IN-ONE SKID-SHOVEL is now available for International TD-6, TD-9, and TD-14 crawler tractors. The Drott shovel may be used as a Bulldozer, Bullclam Shovel, Skid-Shovel, or a hydraulically controlled Clamshell. Circle No. 6 for free bulletin on this versatile shovel.

CORROSION RESISTANT PIPE by Johns-Manville Co. is the subject of an interesting booklet available for you. Transite Mine Service Pipe made of asbestos, cement, and silica by a special process, stubbornly resists corrosion. Circle No. 7 for your copy.

ELECTRIC CORE-DRILLING: A new light-weight, portable electric core unit with detachable bits is now available for use by miners and prospectors. According to the Demo Tool Co., the 37 lb. drill, can drill fast self-cleaning holes from ½-inch to 6-inches in diameter, up to 100 feet deep. Price $525.00. Circle No. 8 for further information.

URANIUM INSTRUMENTS: The Eberline Instrument Division of Reynolds Electrical and Engineering Co., Inc., have available a complete line of uranium detection instruments and accessories. Among them are a portable uranium ore analyzer for radiometric assaying, deep hole probes, and geiger counters. Circle No. 9 for additional information.

SIX-WHEEL TRUCKS: The International Harvester Company has recently published a booklet describing their new line of Six-Wheel Trucks. New design, engines, and types are described in this illustrated brochure. Circle No. 10 for your copy.

"DO'S AND DONT'S" of handling powder are discussed in a new leaflet published by the Atlas Powder Co. The leaflet contains a new, revised list of instructions and warnings on the proper handling and use of explosives and blasting supplies. The list has been recently approved by the Institute of Explosive Makers. Circle No. 11 for your copy.

NEW LITERATURE on the IH 55 Payscraper and IH 75 Paywagon earth-moving equipment has recently been released by the International Harvester Export Company. These catalogs, in English, feature detailed illustrations and specifications of the high-speed two-wheeled rubber-tired Diesel tractors and their matching scrapers and wagons. Circle No. 12 for a copy.

PILOT PLANT DRYERS: Hardinge Company, Inc., has introduced a selection of self-contained pilot plant or laboratory size Ruggles-Coles Rotary Dryers, available in three models. All units are extremely compact and portable, mounted on a steel frame, and require only fuel and electrical connections to be placed in operation. Circle No. 13 for bulletin.

NEW SYNTHETIC HOSE: A new lightweight hose constructed entirely of synthetic materials has been developed by Quaker Rubber Division, H. K. Porter Company, Inc. The hose is capable of handling air continuously at temperatures up to 400° F., and pressures up to 100 psi. It is available with inside diameters from ¾ to 5-inches, and in lengths up to 50 feet. Circle No. 14 for further information.

TRUCK LOADER: A new front end loader which can be attached to the front of your truck is now available from the Ernest Homes Co. This device permits the driver to load, haul, dump, do light digging, and grading. Circle No. 15 for descriptive bulletin.

PRESS FOR ROPE FITTINGS: Solid fusion of fittings to wire rope in up to 30 seconds is possible with the new Skookum-Cooke Cold Flow Press. The Skookum-Cooke four-part dies for the press provide equalized pressure on the electric alloy steel fittings which causes a cold flow of metal to form a grip that holds beyond the breaking strength of the rope. Circle No. 16 for further information.

HEAT-RESISTANT BELT: The B. F. Goodrich company has developed a new conveyor belt designed to convey hot materials. The new line of hot material belts is called "Solarflex." Tests show that the special rubber remains pliable and elastic when handling materials at temperatures up to 350° F. Circle No. 17 if you have a hot material handling problem.

FANS AND BLOWERS: A catalog is available for you illustrating and describing the complete line of Jeffery Ventilating Equipment. The brochure covers all types and sizes of fans and blowers to meet every mining condition. Complete sets of tables and friction charts are included. Circle No. 18 for your copy.

4-WHEEL DRIVE UNITS: New literature released recently by Napco Products Division of Napco Industries, Inc., includes pamphlets describing Napco's Powr-Pak 4-wheel drive units for use with GMC and Chevrolet trucks. The brochures are printed in English and Spanish. Circle No. 19 for your copy.

ROPE BELT CONVEYOR: A new catalog published by the Goodman Manufacturing Company has recently been released. The brochure describes the Goodman Rope Belt Conveyor, a new concept of belt conveyor design that supports the loaded belt on chain-linked idlers suspended between two stationary parallel wire ropes. Circle No. 25 for your copy.

NEW EXCAVATOR-CRANE: A new bulletin describing the Bucyrus-Erie 15-B excavator-crane is now available. Generously illustrated with on-the-job photographs and closeups of mechanical features, the 40-page booklet includes complete specifications and working ranges. Circle No. 26.

Circle numbers and mail this card for free product literature

to get further information on any item described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP card at the right, and mail. If mailed from a point outside the United States, proper postage must be used.

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INTERNATIONALLY AVAILABLE now is the Gardner-Denver Rotary 600 Portable Air Compressor. The unit features compactness, light weight, water cooling, and many other advantages. It may be used successful under extremes of altitude and temperature. Circle No. 34 for further information.

LEARN TO CORE DRILL: A new manual called "Basic Procedures of Diamond and Shot Core Drilling" has recently been published by the Acker Drill Company, Scranton, Pa. The 35-page handbook is profusely illustrated and covers everything from setting up the drill, to pulling core. Copies are available for $1.00. Circle No. 35, or contact company direct.

STOP NOISE from air-operated equipment with a new Pneumatic noise attenuator developed by the Allied Witan Company, Cleveland, Ohio. According to the manufacturer the unit called "Automuffler" eliminates 99% of objectionable noise of air-operated equipment. Circle No. 36 for further information.

TWO NEW GRADERS: Two new motor graders featuring a torque converter and full power shift transmission—the 140-hp Huber-Warco 7-D and the 100-hp 6-D, are being announced by the Huber-Warco Company of Marion, Ohio. Complete hydraulic controls are also featured. Circle No. 37 for details.

KNOW EXACTLY the weight of your material with Fairbanks, Morse & Co. new line of Floaxial cabinet dial scales. Thirty-six models are available ranging in capacity from 500 pounds by ½ pound graduations to 120,000 pounds by 20 pound graduations. Circle No. 37 for further information on these new type scales.

DENVER AUTOMATIC SAMPLER with End Carriage has been introduced by Denver Equipment Company engineers to provide accurate sampling results in normally inaccessible places. By taking the whole of the stream part of the time, this sampler eliminates errors resulting from variations across the stream. Circle No. 38 for details.

STOP THOSE OIL LEAKS with a new and improved OYLTITE-Stik. This product in stick form is designed to stop oil leaks in pipes, containers, tanks, etc. May be used where oil pressure is up to 75 psi, and temperatures up to 400° F. Circle No. 39 if you want your oil leak stopped.

PORTABLE PUMP: All heavy-duty pumping—mud, muck, sand etc.—is easily handled by the new 120-lb., gasoline engine powered diaphragm pump recently developed by Homelite Co. With a pumping capacity of 5,000 gallons per hour, the new Model 20DP3 solves many de-watering problems. Circle No. 40 for further information.

LARGE CARBIDE INSERTS Rok-Bits are now available from Brunner & Lay, Inc. The company offers 4 and 4½-inch gauge, carbide-insert Rok-Bits, designed for J-7.50 threaded drill rods, without the need for an adapter. Six-inch RokMaster Rok-Bits are also available. Circle No. 41 for additional information.

MINING TOOL CATALOG: Illustrating mining tools and bits for cutting and drilling, a new catalog is now available from the Mining Tool Division of Kennametal Inc. The booklet features information on rotary drill bits, bits for coring, roof bolt holes, auger, open pit, and many others. Circle No. 42 for your copy.

IMPROVED PAYSCRAPER LINE: Design changes brought about by close customer-engineering cooperation in the field on jobs is reflected in the new improved 1956 International Harvester self-propelled, rubber-tired Payscraper line. Two new models now in production are the 262-hp "75" and the 172-hp "55" Payscrapers. Circle No. 43 for further information on these improved units.

EASY STARTING of your Diesel engine is now possible with the improved direct electric starting systems just announced by Caterpillar Tractor Co. as attachments for D6, D4, and D2 Tractors and several Traxcavator models. The equipment comprises two ether starting aids and the necessary tubing to inject vaporized ether into the air intake manifolds. Circle No. 44 for more information.

URANIUM FLOWSHEET: A flowsheet on uranium concentration has been published by Denver Equipment Co. The flowsheet illustrates the latest proven processes for uranium concentration known as "Resin in Pulp," (R.I.P. Process). Circle No. 45 for your copy.

NEW COMPRESSOR: The Joy Manufacturing Co. announces the production of a new 600 cfm rotary portable compressor. The Joy Airvane features the Thermal By-Pass feature, heart of the Airvane temperature control system, which results in uninterrupted performance and economy. Circle No. 46 for further information on this new compressor.

USS-PAKS: Easily stored 5-lb. USS Nail-Paks are shipped in sturdy cartons of 20 that take up far less warehouse space than bulky, hard-to-handle kegs. These compact packages avoid the safety hazard and waste of loose nails. Circle No. 47 for details.

STOP RUST with Rust-Oleum is the title of the new 1956 general catalog issued by the Rust-Oleum Corporation. The new catalog presents an important treatise in rust prevention with illustrations of Rust-Oleum uses and applications throughout industry. Circle No. 48 for your copy.

LITERATURE DIRECTORY: A new 24-page directory of product literature—"This is A-C From A to Z," has been released by Allis-Chalmers Manufacturing Company. The booklet contains an alphabetical description of products and their descriptive literature, plus other useful facts. Circle No. 49 for your copy.

LIGHT DUTY MINE HOISTS: Vulcan Iron Works has recently released a bulletin describing their new line of light duty mine hoists. These range in size from 45 to 110 hp, with a rated pull up to 7500 pounds. They feature a fluid coupling drive, double post brakes, forward and reverse transmission. The hoists may be used for vertical or inclined shafts, and meet all mine safety laws. Circle No. 50 for your copy.

TC GYRATORY CRUSHER BULLETIN: Traylor Engineering and Mfg. Co. offers a copy of Bulletin No. 126 to all interested readers. Complete specifications and descriptions of the outstanding features of Traylor TC Gyratory Crushers are included. If you are planning a new crushing plant or expansion of existing facilities, you will want a copy of this informative bulletin. Circle No. 51.

TREATED TIMBER CUTS COSTS: Osmose Wood Preserving Co. of America, Inc. offers a 16-page book entitled "Force Down Your Operating Cost" to mining men interested in making their timber last 3 to 5 times longer. The book tells all about the Osmosalts treatment. If timber decay or wood destroying insects are causing you problems, circle No. 52.

"REPAIR OF CAST IRON PARTS" is the title of a new, fully illustrated four-page booklet by The International Nickel Company, Inc. It outlines the latest information on the welding of cast iron with Ni-Rod and Ni-Rod "55." Nine graphic case histories show the welding electrodes in action. Circle No. 53.

For Free Product Literature see other side

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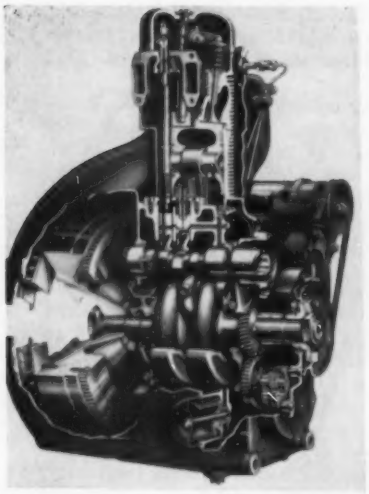
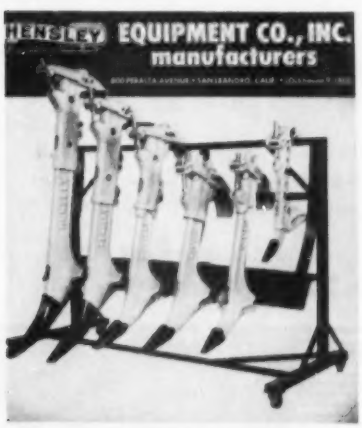


German Air-Cooled Diesel Becoming Popular in U.S.

The air-cooled Deutz Diesel engine manufactured by Kloeckner-Humboldt-Deutz A.G., Cologne, Germany, and distributed by the Diesel Energy Corporation in N.Y., is finding increased applications in U.S. industry. The engine is being used in compressors, trucks, pumps, power plants, crawlers, etc. A range of engines with outputs from 5 to 250 hp are available.

The advantages realized from this engine are many; among them are low fuel consumption, and trouble free cooling system. The air-cooling system avoids many dangers inherent to the water-cooling system. Air-cooled engines warm up quicker, and are equally suited to extremes in climatic conditions. According to the manufacturer the Deutz engine starts and generates full power immediately, and also requires less maintenance work. The engines may operate on gasoline also. Circle No. 74 for further information.



Rippers For All Types Earthmoving Equipment

Shown above is the complete line of Hensley Heavy-Duty Single Tooth Rippers. When installed on your dozer they are an excellent tool for rough jobs where space is important. The rippers are recommended for use on perma-frost, grubbing, clearing, rock raking, and tree stumping. Available also are Twin-Shank Dozer Rippers to rip and move dirt at the same time, Twin-Shank Dozer Brush Rakes for brush clearing, Rippers for scrapers, and cutting edges for all types earth moving equipment. Circle No. 65 for further information.

Oremaster Geiger Counter Masters Ore Finding

White's Electronics have developed a new Geiger counter which they claim is more sensitive than many scintillation counters. The 3-tube counter called the Oremaster has many features such as circuit control switch so that any broken or defective tube may be switched out of the circuit, powerful built-in speaker, built-in voltmeter to test batteries while instrument is still working, built-in flashlight, zero control to zero out background count, sensitivity control switch. The instrument is also insulated against temperature and dampness, and may be used on foot, in the air, or in a car. For further information on this versatile counter circle No. 70.

Circular Cage Designed For Core-Drilled Shaft

The Connellsville Manufacturing and Mine Supply Company have available a low-cost custom-built elevator-type man cage, featuring automatic push-button operation. The double deck steel cage is designed to operate in a circular shaft sunk by core drilling. The product is available in a packaged unit, which when installed includes: electrical equipment, cage, counterweights, hoist, guides, cables, head frame with hoist house, landing doors and housing. The cage is wired for lighting and telephone. Circle No. 66 for further information on this packaged hoisting unit.

Notes From The Manufacturers

George Caraker of White's Electronics, Sweet Home, Oregon, will spend the next six months touring Africa, introducing various radiation detection instruments manufactured by the company. Mr. Caraker has spent several years in Africa and is well acquainted with the mining industry and personnel in South Africa.

Hyster Company, manufacturer of industrial lift trucks and tractor equipment, will construct a new plant in Danville, Illinois, according to Eugene Caldwell, vice president and general manager. Lift trucks and tractor equipment are presently produced at Hyster factories in Portland, Oregon and Nijmegen, The Netherlands.

Ledeen, Inc., manufacturer of pneumatic and hydraulic cylinder valves, actuators, pumps, and special equipment, broke ground recently for new headquarters at 3350 North Gilman Road, El Monte, California. The new plant will also serve as headquarters for Engineering Products Company, a subsidiary, distributing mechanical power transmission and materials handling equipment.

Har-Mel Exporting and Importing Company, an affiliate of southern California's Har-Mel Oil, Tire and Rubber Company, is now in full operation. The firm will specialize in overseas supply of quality rubber and petroleum products at competitive prices. Complete lines of lubricants, batteries, and tires for trucks and industrial vehicles are available.

Milton T. Smith has been elected president and general manager of Marion Power Shovel Company and its subsidiary, the Osgood Company. He has served as vice president and general manager for both companies since March, 1955. They operate as part of the Equipment Department of Merritt-Chapman & Scott Corporation.

Lyle Hallberg has been added to the testing division staff of Western Machinery Company as mineral testing engineer. He previously was active in mining operations in Idaho, Montana, and Washington. Alvaro Cardona, now a laboratory helper in the ore testing division, was formerly engaged in mining activities in El Salvador, Central America.

Glenn Carrington recently announced the sale of Glenn Carrington and Company, leading Seattle-Alaska distributing house, to the employes and Alaska business associates of the firm. The new organization, The Carrington Company, has been incorporated by the purchasers, with Arthur F. Erickson as president. The company maintains offices in Anchorage as well as warehouses and branch in Fairbanks and headquarters in Seattle, Washington.

H. B. Alford has been appointed chief field engineer for Western Precipitation Corporation. He will be responsible for all service, construction, and inspection activities throughout the United States and Canada.

Drifts and Crosscuts

Continued from page 33

reports of mining developments in those areas were obtained.

These abstracted comments from recent letters outline some of the problems they encountered. Their difficulties and operating problems should interest all readers.

"I am in bed now recovering from a very nasty attack of typhoid fever. Knowing that you can not wait after March 15th, I have to send you a very meager report for 1955 developments. Perhaps you can tune it up a bit with some of the latest news."

"In the district any increase in mineral output in 1956 will be governed by local lawless conditions. A very large amount of capital will be required to rehabilitate the mines, and get the destroyed dredges replaced and working."

"This report represents the true situation of Argentine mining after 10 years of concealment imposed by the deposed dictator, Juan Peron."

But censorship, suspicion, and difficulties exist closer to the United States as shown by the request "In case of inquiries you do not disclose your source of information."

A complete and general strike immobilized everything in Finland for several weeks in March. Even in great emergencies ambulances didn't operate, telephones were dead, and all transportation was nonexistent. Miners are resourceful as this letter dated March 14 indicated when it reached San Francisco on March 22nd. "The general strike has been in effect in Finland since March 1st and is still continuing. I am trying to get my report through via special channels. My sincere hope is that this report reaches you in time to be of value." It did and you can read it in the Yearbook.

Slowness of communication, secrecy, nonuniformity of reporting, shortage of engineers, and other similar reasons make it especially difficult to assemble, compile, and release mineral production figures in many foreign countries. Typical is this letter, "At last I got for you the official mineral production figures for 1955. Please note that the dollar value of the exports has changed considerably. Payment for these minerals is based on market values three to four months after actual shipments. Take also in mind that the mineral export table is not at all the same as production."

The last example is the best to show how information can be obtained "under the table." "Perhaps yet I might manage to write something. After much haggling, drinking of tea, smiling, discussing their children's complaints, and enquiring after their gout and sundry other nonsensical past-times with these officials that matter here, I did get some information. I am still knocking on doors for other information. But so far all are too tight lipped. (Of course I know only too well that if I threw a cocktail party for some of these big-wigs I should have my information next morning on my office desk. I am cussed enough never to wangle things by these means—and I confess my tongue has managed alone to get me many things, so I persevere in flapping my epiglottis and hoping."

Here's hoping that you think the Yearbook is the best ever.

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Capitol Concentrates

Continued from page 37

Coal Mine Inspection Act to other mining enterprises.

The new crop of bills includes S. 3097 by Senator Langer, H. R. 9294 by Representative Blatnik, H. R. 9269 by Representative Kelley, and H. R. 9343 by Representative Metcalf. Needless to say these bills are neither wanted nor necessary. Fortunately, this proposal would get into the President's hair as he already has supported S. 1091 which would grant to the states federal funds with which to set up advisory services in health and safety measures without any extension of federal activities. The merit of this idea also is questionable, but because of Administration approval of this route for control the Bureau of the Budget will not recommend the enactment of S. 3097 or its companion bills and has so reported to the Congress. This no doubt kills the move for this session.

The type of police measure represented by these bills—which also would create an enlarged bureaucracy and much paper work for the mining companies—may be understood by the section which states that if the demands of the Secretary of the Interior or his representatives for admission to the property or for information are not met, the operator "shall be guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine not exceeding $500 or by imprisonment not exceeding 60 days, or by both."

A comparatively unknown ex-Bureau of Mines employe, Marling J. Ankeny, has been mentioned as a candidate for director of the U. S. Bureau of Mines. It is rumored that Ankeny strongly supports a metal mines inspection bill—probably because he knows nothing about metal mines, such experience as he has had being in coal mining. To say the least, Mr. Ankeny would be persona non grata!

In fact Senator Alan Bible, of Nevada, early in April asked President Eisenhower to withhold the nomination. Senator Bible said that he did not believe Mr. Ankeny was highly trained in any phase of mining except safety aspects of coal.

COMING CONVENTIONS

May 10 and 11. Two-day MINING CONGRESS ON SIGNIFICANCE OF ATOMIC ENERGY sponsored by Southwest Research Institute and Atomic Industrial Forum. San Antonio, Texas.

May 10 through 13. NATIONAL OIL AND URANIUM EXPOSITION featuring machinery exhibits and mechanical devices. Texas State Fair Grounds, Dallas, Texas.

May 10, 11, and 12. Third Annual Convention and Machinery Exposition of the URANIUM ORE PRODUCERS ASSOCIATION, Lincoln Park, Grand Junction, Colorado.

May 11, 12. INSTITUTE ON LAKE SUPERIOR GEOLOGY sponsored by the Michigan Geological Survey and the Exploration Subsection of the Upper Peninsula Section of the AIME. Michigan College of Mining and Technology.

May 14 through 16. Annual meeting of the PERLITE INSTITUTE, Ponte Vedra Beach, Florida.

June 7 to 9, 1956. THIRD INTERNATIONAL LIGHT METALS CONVENTION, Montanistische Hochschule, Leoben, Austria.

June 25 through 29. Annual Meeting AMERICAN SOCIETY FOR ENGINEERING EDUCATION, Iowa State College, Ames, Iowa.

June 28, 29, 30, and July 1. NATIONAL OIL AND URANIUM EXHIBITS featuring machinery exhibits and mechanical devices. The 48th District Agricultural Association Building, Santa Ana Freeway and Eastern Avenue, Los Angeles, California.

September 4 through 11. INTERNATIONAL GEOLOGIC CONFERENCE, Mexico D. F., Mexico.

September 26, 27, 28. Annual ROCKY MOUNTAIN MINERALS CONFERENCE, AIME, Salt Lake City, Utah.

November 1, 2, 3. Annual convention of the NEW MEXICO MINING ASSOCIATION, Carlsbad, New Mexico.

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Wire Rope at Work – Here's an installation that any mine owner could show with pride. It's the "A" shaft headframe at Peterson Mine, in Michigan's Gogebic Range. The Peterson property, which yields large tonnages of iron ore, is operated by Puritan Mining Company, Ironwood.

The largest, sturdiest shaft ropes ever used in this region give added distinction to this twin installation. The balanced skips and the balanced cages require four separate ropes, the pair for the skips being 2¼-in. diameter, those for the cages 1¾-in. All of these husky wire ropes are Bethlehem – Purple Strand grade, of course. Purple Strand is Bethlehem's best. In mines and quarries all over the country, this tough wire rope is more than equal to the jobs assigned it.

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American Zinc, Lead and Smelting Company reports that its *Piquette* joint venture property in Wisconsin, which was placed in production during the second quarter of 1955, has been operating on a satisfactory basis. A total of 4,040 tons combined zinc-lead concentrate was produced at a substantial margin of profit, and the grade thus far mined has been coming up to that indicated by original drilling. With a continuation of present zinc prices, the firm expects to recover its full investment in the property by the end of 1956. American Zinc expects to have its *Cuba City Mining Company* operation producing at the rate of 300 to 400 tons daily by the end of June 1956. The *Vinegar Hill Division* acquisition has been on a profitable basis since the first of January. Heavy cost of development and rehabilitation during the short period of operation last year resulted in a small loss.

Gamarey Corporation has been incorporated at Bismarck, North Dakota to prospect for, mine, and produce uranium and other minerals.

The *Fifth National Clay Conference* will be held at the University of Illinois, Urbana, Illinois, on October 8, 9, and 10. The conference is sponsored annually by the Clay Minerals Committee of the National Academy of Sciences-National Research Council, under the chairmanship of Professor R. E. Grim of the University of Illinois. Contributed papers on subjects related to clay mineralogy or technology will be welcome. Persons interested should contact Dr. W. F. Bradley, Illinois Geological Survey, Urbana, Illinois.

Uranium mineralization reportedly has been confirmed by the U.S. Bureau of Mines on property located just south of Angle Inlet in Minnesota. The discovery was made by Norman Carlson who, with several associates, has formed the *Amerace Mining Company* to develop the property. The group is now waiting permission to ship samples to the AEC ore purchasing depot at Edgemont, South Dakota.

The recent opening of four new producing mines in the area near Knoxville, Tennessee has greatly increased zinc production to a degree where the state may move up from its fifth place in national production. Three of the mines are between New Market and Jefferson City, in Jefferson County. One of these has just started production—the *American Zinc Company of Tennessee's Young* mine; American Zinc is now developing another shaft, the Coy, which will go into production by the end of this year. The *New Jersey Zinc Company* will place its new mine near Jefferson City in production later this year, with an output of about 1,000 tons daily, and next year hopes to open an even larger mine—the *Flat Gap* at Treadway, Hancock County—with an output of about 2,000 tons daily. Currently expanding is *U.S. Steel Corporation's Tennessee Coal & Iron Division* which has increased production at its operation near Jefferson City to 1,500 tons daily.

The Office of Defense Mobilization has announced that the minimum stockpile goals have been reached for such materials as aluminum, tin, tungsten, zinc, lead, industrial diamonds, mica, columbite, fluorspar, manganese, vanadium, and others. Long term objectives have been reached for crude aluminum oxide abrasives, chrysotile and crocidolite asbestos, Madagascar graphite, rare earths, tantalite, and vanadium. The materials total 46 items, but the ODM has emphasized that the needs are constantly changing and the list is not static. Deliveries to the government stockpile during the last six months of 1955 totaled $167,000,000.

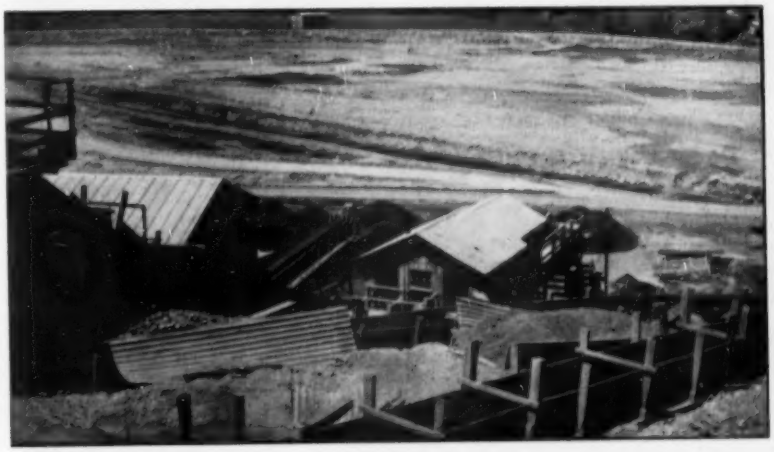
Appalachian Sulphides, Inc. (a subsidiary of *Nipissing Mines Company Ltd.*) reports excellent progress at its *Ore Knob* copper property in North Carolina. Shaft sinking has reached a depth of 750 feet on its way to its first objective of 990 feet. Ultimate shaft depth will be 1,260 feet, and the company has arranged its program so that lateral development and shaft sinking can be carried on simultaneously. After 990 feet is reached, lateral work will be concentrated on opening levels at 700, 840, and 980. Design of a 700-ton mill is in progress. Appalachian's *Elizabeth* copper mine in Vermont has been doing extremely well. Its purchase price was returned in less than a year's time. During 1955 239,400 tons of ore were treated. Ore reserves are now estimated at 1,200,000 tons averaging 1.17 percent copper. An extensive exploration program is in progress in the general area of the Elizabeth mine. At Pike Hill to the north the last two drill holes indicated 1.5 percent copper; only sulphides had been cut earlier.

Illinois Zinc Company has acquired a substantial stockholder interest in *Continental Titanium Corporation* which owns a process for producing pure titanium metal in ingot form.

The U.S. Bureau of Mines Department of the Interior has established a group of graduate fellowships in metallurgy and related fields at Carnegie Institute of Technology. The fellowships will be available for the next academic year beginning September 1. Graduate students selected by a joint committee will do research under supervision at both the Carnegie Tech Metals Research Laboratory and the Bureau's pilot plant facilities adjoining the campus.

Climax Molybdenum Company has announced a $600,00 expansion program at the Langeloth, Pennsylvania plant which will double molybdic oxide capacity. Current output is 2,700,000 pounds annually. A second sublimination furnace will be added by September.

A new American Standard on Safety Procedures for Quarries has been released by the *American Standards Association*. It is designed to eliminate frequent and serious hazards in quarrying, and covers all open pits from which metals and nonmetallics are mined. The standard is M28.1-1955 and is available at $1.50 per copy from the ASA at 70 East 45th Street, New York 17, New York.



Washing Plant Treats Virginia Manganese Ore

Virginia Iron Coal and Coke Company takes advantage of natural drainage to reclaim waste water from its manganese ore processing plant at Elizabethton, Tennessee. The practice conserves the firm's natural water supply and saves the cost of obtaining well water for daily operation. Company trucks deliver ore to the plant, located on a hill overlooking a clear water pond. The ore is dumped into a chute and goes through a series of crushing, washing, and screening operations. A 75-hp. Deming centrifugal pump sends 1,200-gallons per minute from the clear water pond 1,400 feet to the mill. It discharges into a 125-hp Deming centrifugal that pumps water into the mill under 150-psi pressure. Streams of water wash the ore in several of the processing operations. The waste, a mixture of clay and water, is carried off in water troughs (see in foreground above) to a large dry lake (background above). Since the bottom of the clear pond is below the mean water table, the waste water filters into it for use again in the mill. Piles of washed ore can be seen below the washing plant in the picture above.

The *Florida Board of Parks and Historic Memorials* has granted a five-year lease to the *Nuclear Magnetic Mining Company* of St. Augustine to dredge for titanium-bearing minerals in the Salt Run area of the Anatasia State Park near St. Augustine. The company has agreed to pay the state $1.00 per ton for material dredged, or to pay three percent of the market value, whichever is greater. The firm reportedly has developed an extracting process of its own for the recovery of titanium and other minerals from the sands. Nuclear Magnetic Mining still must obtain a permit from the U.S. Corps of Engineers. The Board of Parks turned down an application by the *New York & Honduras Rosario Mining Company* to mine titanium-bearing sands on Little Talbot Islands, northeast of Jacksonville. The Park Board claimed that the mining would change the character of the park which is maintained as a bathing and picnic area.

Kings Mountain Mica Company, Inc. plans to expand its production of scrap mica in keeping with an increased demand for the material. The firm (and its predecessor) has been mining on the J. Bun Patterson property north of Kings Mountain, North Carolina since 1948. New operations will be undertaken on the Charles H. Moss property on which leases were obtained six years ago.

Union Carbide Development Company has been formed as a new division of *Union Carbide and Carbon Corporation*. Operating divisions of the firm will continue, as in the past, to carry on their own research and development activities in Union Carbide's seven major fields of activity: alloys and metals; chemicals; electrodes, carbons, and batteries; industrial gases and carbides; nuclear energy; plastics; and silicones. Birny Mason, Jr., secretary of Union Carbide, has been appointed president of the new company.

Foote Mineral Company and *Electro Manganese Corporation* board of directors have agreed to a merger on a share-for-share basis, with Electro becoming a division of Foote. Final approval of Electro stockholders is necessary, as well as the United States government's consent to assignment of a certain contract Electro has with the General Services Administration. Foote is a long established company, with lithium mines at Kings Mountain, North Carolina, and chemical plants at Sunbright, Virginia, and Exton, Pennsylvania. The stock exchange will add a new product to Foote's line providing more diversification for the firm.

In Crittenden and Livingston Counties, Kentucky, nearly all fluorspar mines remained closed during 1955 because of low prices. However, the *Pennsylvania Salt Company* continued to sink a 400-foot shaft on the *Dyer's Hill* ore body, west of Salem, Kentucky. The firm has improved the flotation mill at Mexico, Kentucky by the addition of lead and zinc sulphide circuits and a crushing plant. J. Willis Crider also erected an HMS plant near Mexico, Kentucky, during the year where he is treating both his own and custom fluorspar ores.

National Lead Company has announced a 25 percent expansion of its ilmenite mine and mill at Tahawus, New York, to be completed this year. A fifth production line will be installed, another shift will be added to the mine force, and some extra manpower will be required in the mine and mill sections. The company discovered large deposits of titanium minerals on company land last year and reserves of 50,000,000 tons have been proven to date.

St. Joseph Lead Company plans to increase present output of its refined zinc plant at Josephtown, Pennsylvania from 10,000 tons month to 12,000 tons and 2,500 tons of lead-free zinc oxide. A $16,000,000 power plant will be built to supply an additional 100,000 kilowatts so that zinc plant capacity may eventually be increased to 15,000 tons monthly if desired.

Tennessee Copper Company at Copperhill, Tennessee has installed new roaster controls in its smelting department for better control of its sulphuric acid production.

The Defense Minerals Exploration Administration has negotiated several minerals exploration contracts for mica recently in North Carolina. *C & D Mining Company* received a contract for $4,624 to explore for mica in Avery County, the government's share $3,468; Sam G. Smith, $3,376 contract in Avery County, government's share $2,532; John Jarrett et al, $4,220 contract in Mitchell County, government share $3,165; John Phillips, $5,744 contract in Mitchell County, government share $4,308. A $6,516 contract has also been granted to W. Hugh Allen to explore for beryl in Troupe County, Georgia.

A $25,092 contract has been awarded *University of Tennessee* for another year's study of Tennessee uranium-bearing Chattanooga shale. Dr. Paris B. Stockdale, head of the University's geology and geography department, has been studying an area bounded by Moore County on the south, and running north to Kentucky, and west to Sumner County. Tennessee has two other major outcrop areas of shale. It appears in a belt from Chattanooga to Cumberland Gap, and also along the eastern side of the Sequatchie Valley.

Effective April 1, the contracting and mining businesses of *E. W. Coons Company* were separated into two organizations. The contracting business will be carried on as the E. W. Coons Company, headed by Walter E. Wilson, and will continue to be located at Grant and First Avenue in Hibbing, Minnesota. The mining business will be carried on under the name of *Pittsburgh Pacific Company*, headed by Hugh H. Harrison. These offices will be at 2521 First Avenue, Hibbing. Welby C. Cohoe, who has been with the E. W. Coons Company for over 35 years, will be associated primarily with the mining organization. The operation of the mining properties of Pittsburgh Pacific will be managed by *Pacific Isle Mining Company*.

In 1955 *M. A. Hanna Company* operated 13 mines or groups of mines in Minnesota; five mines produced ore in Michigan; and the *Iron Mountain* mine operated in the Ozarks of Missouri. The *Mississippi* group was the largest producer last year, and it is expected to be the same in 1965. The *Morton* is a large and active property where there will be both stripping and mining during the year. This will also be true of the *Perry-Wyman* and *Carlz*, as well as the *Enterprise*. The *Douglas, South Agnew, Cooley, Cuyuna* group, *Portsmouth*, and *Spring Valley* all expect to have a busy season. In Michigan there are four underground operations which produce on a fairly consistent basis. Hanna shipped a total of 14,196,000 tons of iron ore in 1955 and this is expected to be about the same in 1956. During the 1956 season a heavy media unit, including cyclones, will be added to the Douglas plant for the treatment of lean ores at this mine, and from properties in the vicinity, including the *Enterprise, Weggum, South Agnew*, and *Morton*. At the far west end of the Mesabi, the *Parcel Three* will produce its first ore in 1956.

The *Oliver Iron Mining Division* of the *U.S. Steel Corporation* opened the 1956 shipping season on April 5th, when electric shovels started loading ore at open pit mines at Hibbing, Chisholm, and Virginia, Minnesota. Ore was also loaded at Oliver's underground mines at Ely and Soudan. The division expects to ship more than 36,000,000 gross tons of iron ore during the 1956 season, and may even slightly exceed the 36,245,550 gross tons shipped by Oliver in 1955. In addition to its extensive mining operations on the Mesabi and Vermilion Ranges, Oliver will operate 12 ore treatment plants on the Mesabi Range. During the winter, Oliver was busy with mine stripping and development work.

The *Inland Steel Company's* "Wilfred Sykes" was the first ship from the lower lakes to arrive at the head of the lakes for the 1956 season. It docked at the Superior, Wisconsin port on April 5. The general outlook for this year's shipping season is excellent. Fleet owners are willing to run early season risks because demand for steel is so terrific. A year ago mills and Lake Erie docks were well stocked with ore, and it wasn't until May, June, or July that many of the fleets put all of their ships into service.

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Anaconda Starts Major Pit At "Richest Hill On Earth"

The Anaconda Company's Butte, Montana Hill long famed as "the richest hill on earth" will hold that honor for a long time with the company's recently announced expansions in mining operations. Not only will mining be expanded underground but a major open pit—The Berkeley—is being rapidly developed. Churn drilling since 1954 has already developed 100,000,000 tons of 0.80 plus percent copper with some silver. More than 4,500,000 tons of waste have been stripped in the new pit area. Production plans call for mining 5,000 tons of ore per day by mid-1956, 10,000 tons per day by January 1, 1957, and 17,500 tons daily by mid-1957.

The Berkeley pit will be south and east of the Kelley ore zones now being mined by block caving. The Berkeley ore is formed by a series of small copper bearing veinlets in altered granite plus disseminated copper mineralization. Secondary enrichment has been important in ore formation under a shallow waste capping.

Enlargement of the Anaconda, Montana copper concentrator is already underway to process Berkeley ore. Expansion is scheduled for completion during the first quarter of 1957.

Underground development at Butte known as the Northwest Project has been started. A new shaft, the Ryan, will be started and eventually equipped for large scale hoisting. The new shaft will permit development and mining of copper and zinc ores, increase production of both ores, take the hoisting load off other deep shafts in the district, and assure adequate future hoisting capacity for low grade ores in the area.

A major geologic program coupled with selected mine development is underway to prospect favorable geologic areas in the district. Initially it is confined to copper areas and important vein discoveries as well as both open pit and block caving low grade areas have been discovered by diamond and churn drilling from underground and surface. This program is being continued.

Chester H. Steele is vice president in charge of Anaconda's western operations with headquarters in Butte.

At the *Lookout Mountain Mining and Milling Company* property in the Pine Creek lead-zinc district of the Coeur d'Alene mining region, Shoshone County, Idaho, exploration work has been resumed from a long crosscut driven from the adjoining workings of *Sunset Mines, Inc.* At last report, drifting was underway in a mineralized shear zone.

Another Pine Creek district operator, *Nabob Silver-Lead Company*, will soon start sinking on a zinc-lead ore body discovered several years ago on the adit level. The ore shoot has been developed for a length of about 500 feet and diamond drilled to a depth of 200 feet. Raising showed that the top of the ore body was 60 feet above the main tunnel.

Polaris Mining Company's East Exploration project in the Silver Belt of the Coeur d'Alene mining region, Shoshone County, Idaho, had been driven about 8,500 feet at last report. It had penetrated several hundred feet into ground owned by *Rainbow Mining and Milling Company*. About 1,500 feet remained to be driven in the long bore from the 3000 level workings of the *Silver Summit* mine. Lateral work then will be undertaken. Polaris is opening a new silver-copper ore body found by diamond drilling from the new 2500 level of the Silver Summit mine; also an ore shoot in *Chester Mining Company* ground, reached from Silver Summit's 3000 level. Mining and development work also is underway in the New Purim area.

Production at the *Big Creek* property of *Sunshine Consolidated, Inc.*, in the Silver Belt of Idaho, has been running at more than 2,000 tons monthly. Work currently is underway to open the ore zone on the 3,700-foot level and to explore a large unexplored area to the west on the 3100 level.

The Silver Mountain shaft east of Mullan, Shoshone County, Idaho, had reached a depth of more than 300 feet at last report. The work is being done by *Hecla Mining Company* of Wallace. *Bunker Hill Company* of Kellogg is equally interested in the deep development project.

East of Mullan, Shoshone County, Idaho, *Lucky Friday Silver-Lead Mines* has put its new three-compartment vertical shaft into operation and intends to step up production from the old rate of about 125 tons monthly. Development work on the bottom 2300 level has

Southern California Minerals' Subsidiary Operates New Talc Grinding Mill in Montana

A new talc grinding mill is now in operation at Barratts, Montana by Tri-State Minerals Company, a wholly owned division of Southern California Minerals Company of Los Angeles, California. The installation is located on a company-owned siding eight miles south of Dillon, Montana, on the main line of the Union Pacific Railroad where the firm has operated a talc washing plant for several years. The talc producing properties are located 14 to 30 miles from the rail siding.

The building housing the new grinding plant is of concrete block construction, 200 feet long and 50 feet wide. Equipment features the latest type of Raymond roll mill, capable of producing 40 to 50 cars of ground and processed talc per month. This mill is a five-roll type and is coupled with a complete crushing and dust collecting system of advance design. It is entirely electrically operated, even to the heating and drying processes. The low winter temperatures dictated the use of electric power since preheating and activating by oil, plus maintenance of a boiler 365 days a year, can be costly. Savings in time and elimination of inconveniences are the bonuses gained through use of electric power.

The mill, incidentally, is totally enclosed, including the central 70-foot-high steel tower, protecting all equipment from the rigors of the wind, snow, and frigid outside temperatures.

Large reserves of talc have been developed by Southern California Minerals Company, and at Barratts the firm retains large stockpiles for winter operation. The firm's mines include its first, the Excelsior (1936) in Death Valley, California; the Acme (1939) at Tecopa; the Superior (1940) near Death Valley Monument's east edge; the Calmasil (1942) at Paso Alto; and more recently acquired, the Panamint, Bonnie, Saratoga, Monarch, and Crystal Springs.

Added to these California reserves are the Montana properties, acquired since 1942, which contain the highest grades of steatite talc. These are in the Dillon area, and include the Smith-Dillon, Keystone, Treasure, Crescent, Whitney, Liberty, Crown, and Estrella.

Tri-State Minerals operates another grinding plant at Ogden, Utah, where talc from Montana is shipped to be ground along with talc from company owned mines in California. A Raymond roll mill is operated at this plant, plus a Hi-Speed vertical mill for producing "Lo-Micron" sizes of talc which is linked with a new process for producing the lowest known micron sizes of talc by fluid energy milling. Installed in 1953, this process is the only one of its kind, except for the original pilot plant in New Jersey.

SCMC also has two other Raymond mills in Los Angeles—one which has been opreating continuously since 1936, and the other since 1951. These mills furnish talc and clay to the California trade, and make shipments east.

Tri-State Minerals' new talc mill on company-owned siding at Barratts, Montana

opened ore for 1,200 feet. At last report, the east face still was in ore. C. E. Horning of Wallace is president.

Six months' work at the *Deer Trail* zinc-lead property of *Highland-Surprise Consolidated Mining Company* near Stanley, in the primitive area north of Sun Valley, Idaho, has indicated 127,500 tons of ore from the surface to a depth of 200 feet below the main adit. About 1,800 tons of ore have been stockpiled from exploration workings. Tibor Klobusicky is company engineer in charge.

A silver-copper vein being developed in the *Galena* mine at the eastern end of the Silver Belt, near Wallace, Idaho, has improved with depth from where first opened on the 3,000-foot level. The ore shoot lengthened from 700 feet to 800 feet, widened slightly to an average of 6 feet, and increased in grade from 37.1 ounces of silver to 50.0 ounces per ton. The ore also carries 1.7 percent copper. Hoisting capacity will be increased with completion late this year of a second direct opening to the surface. The property is being operated under lease by *American Smelting and Refining Company*. It is owned by *Vulcan Silver-Lead Corporation*, a subsidiary of *Callahan Zinc-Lead Company*. *Day Mines, Inc.* of Wallace has a 25 percent interest in the lease. Current production is at the rate of about 100,000 tons per year.

At the old *Hercules* mine at Burke in the Coeur d'Alene mining district, Shoshone County, Idaho. *Day Mines, Inc.* has opened a 500-foot length of zinc-lead-silver ore in the Rambler vein on the new bottom 1600-foot level. The ore was continuous rather than interspersed with barren material as on higher levels in the far western part of the mine. The new 1,100-foot level in the company's *Dayrock* mine near Wallace is yielding ore of average grade. Lessees are working the firm's *Tamarack*, *Monitor*, and *Sherman* mines. The Gold Hunter shaft near Mullan is being unwatered to the 1200 level following shaft repairs to the 650-foot level. Henry L. Day of Wallace is president and manager.

The *Bunker Hill Company* is the new name of the *Bunker Hill and Sullivan Mining and Concentrating Company* of Kellogg, Idaho. The firm has voted to change the name because business activities have grown beyond those described by the old title, which dated from the company's incorporation on July 29, 1887. The firm achieved many new records during 1955—in the mine, the most tons of ore ever extracted in a single year; in the smelter, the largest quantity of lead ever produced and sold in a single year; in the zinc plant, an increase in the tonnage of zinc produced and sold in a single year; in the sulfuric acid plant, an increase in the tonnage of acid produced and sold in the second year of this plant's operation.

A $17,370 lead-zinc exploration project has been approved by the Defense Minerals Exploration Administration for *Idaho Consolidated Mines' Twin Peaks* property, Lemhi County, Idaho.

A 40-horsepower, single-drum hoist with a cable capacity of 1,400 feet has been installed by *Bradley Mining Company* at its *Ima* tungsten mine near Patterson, Lemhi County, Idaho. The hoist was manufactured by *Coeur d'Alene Hardware & Foundry Company* of Wallace. C. C. Hathhorn is general manager for the Ima mine.

Five Salmon residents, Dr. John R. Goggins, Charles R. McConnell, Otis M. Gunderson, Corbin J. Moore, and S. H. Selway, and W. P. Ellis of Ellis have incorporated *Agency Creek Thorium and Rare Metals Corporation* of Salmon, Idaho. Capitalization was listed at $300,000. The corporation has 84 claims that are located in the heart of the McDevitt mining area, 21 miles from Salmon.

Mr. and Mrs. E. Keith Evans of Hailey, Idaho, are planning a core drilling program to test extent of uranium and vanadium mineralization they found near the Contintental Divide in Lemhi National Forest, Clark County. They have staked 35 mining claims around the discovery.

Moonglow Mining Company of Boise, Idaho has been incorporated to explore for silver-lead near Mullan, Idaho, and for uranium in the Mount Spokane district of northeastern Washington. Incorporators are Herman Rossi of Boise, and J. A. Allen and J. G. Johnson of Spokane. The firm was capitalized for $600,000.

Construction of a 100-ton gold mill near the *Hawkeye* mine in the Little Rocky Mountains north of Lewistown, Phillips County, Montana is planned by *Little Rockies Mining and Development Company*. Mill machinery has been trucked to the site. Paul Raber of Bismarck, North Dakota is company superintendent.

Young-Montana Company is preparing to start mining iron ore in the Running Wolf Range near Stanford, Judith Basin County, Montana. Ore is to be shipped to Lake Superior ports. E. A. Young of Hibbing, Minnesota is president.

The *Anaconda Company* of Butte, Montana more than doubled its gross sales and earnings in 1955 over the previous year. In the year ended December 31, 1955, gross sales and earnings totaled $630,703,042; for the year ended 1954, gross sales and earnings totaled $461,066,990. Earnings on a capital share went from $3.07 in 1954 to $7.52 in 1955. Higher copper prices, larger production, and greater efficiency of operations were reported to account for the increases.

Western Placer Mining Company of Missoula, Montana has filed articles of incorporation at Helena, with directors listed as William J. Walker, Roy B. Olson, and Henry S. Childs, all of Missoula.

The U.S. Bureau of Mines' zirconium plant at Albany, Oregon is being restored to production at the request of the U.S. Atomic Energy Commission. The plant, which has a capacity of more than 280,000 pounds a year, was shut down a year ago after private industry began producing the strategic metal in quantity. Present capacity of the commercial plants is said to be more than 200,000 pounds annually.

Mineral Sands Company's new treatment plant at Whiskey Run, Oregon, about six miles north of Bandon, is about completed and should be in operation soon. The plant will obtain chromite minerals from the black sands mined about one mile from the plant. Humphreys spirals, electromagnets, roasting, and acid leaching will be the processes used. About 60 feet of overburden must be removed to reach the black sand horizon.

First chromite has been shipped from Washington state. It came from a deposit located between Omak and Conconully, Okanogan County, and was sent to the government purchasing depot at Grants Pass, Oregon. *Chrome Cliff Mines, Inc.* has been organized to develop the deposit which was discovered by James Dow. The firm also has two larger deposits. Total mineral land held by the firm is about 3,000 acres. Fred W. Wagener, Jr. of Prosser is president and Thomas L. West of Spokane is secretary-treasurer.

Greenhorn Mountain Development Company plans to resume operations at its *Pyx* mine in the Greenhorn mining district of Baker and Grant counties, Oregon as soon as weather permits. Operations were suspended last October 1, after development work had opened milling grade gold ore. A 25-ton mill was built at the property in 1954. Ward L. Hill of Baker is manager and secretary-treasurer of the firm.

Painted Desert Uranium and Oil Company has resumed exploration work at a uranium prospect south of the *Daybreak* uranium mine in the Mount Spokane district, northern Spokane County, Washington. Good radioactivity was found in the first diamond drill hole. W. M. Fredericks, Spokane, is secretary-treasurer.

At *Howe Sound Company's Holden* mine, Chelan County, Washington, an adit driven to undercut surface mineralization containing copper-nickel values in a previously unexplored area, has been advanced about 2,500 feet. Insufficient diamond drilling has been done to properly evaluate the work. Production of copper, gold, and zinc is continuing at a normal rate but exploration work is being stepped up in an effort to increase ore reserves. J. S. Roper is manager.

North Star Uranium, Inc. has increased its holdings in northeastern Washington to about 4,000 acres by acquiring leases on 320 acres in the Mount Spokane district and 19 mining claims on Blue Grouse Mountain in southern Pend Oreille County, Washington. The acquisitions were purchased from Thomas Hugill and Martin Stemple, Spokane prospectors. Ron McKelvie is president.

In its first deep drill test on Spokane Indian Reservation land, *Dahl Uranium*

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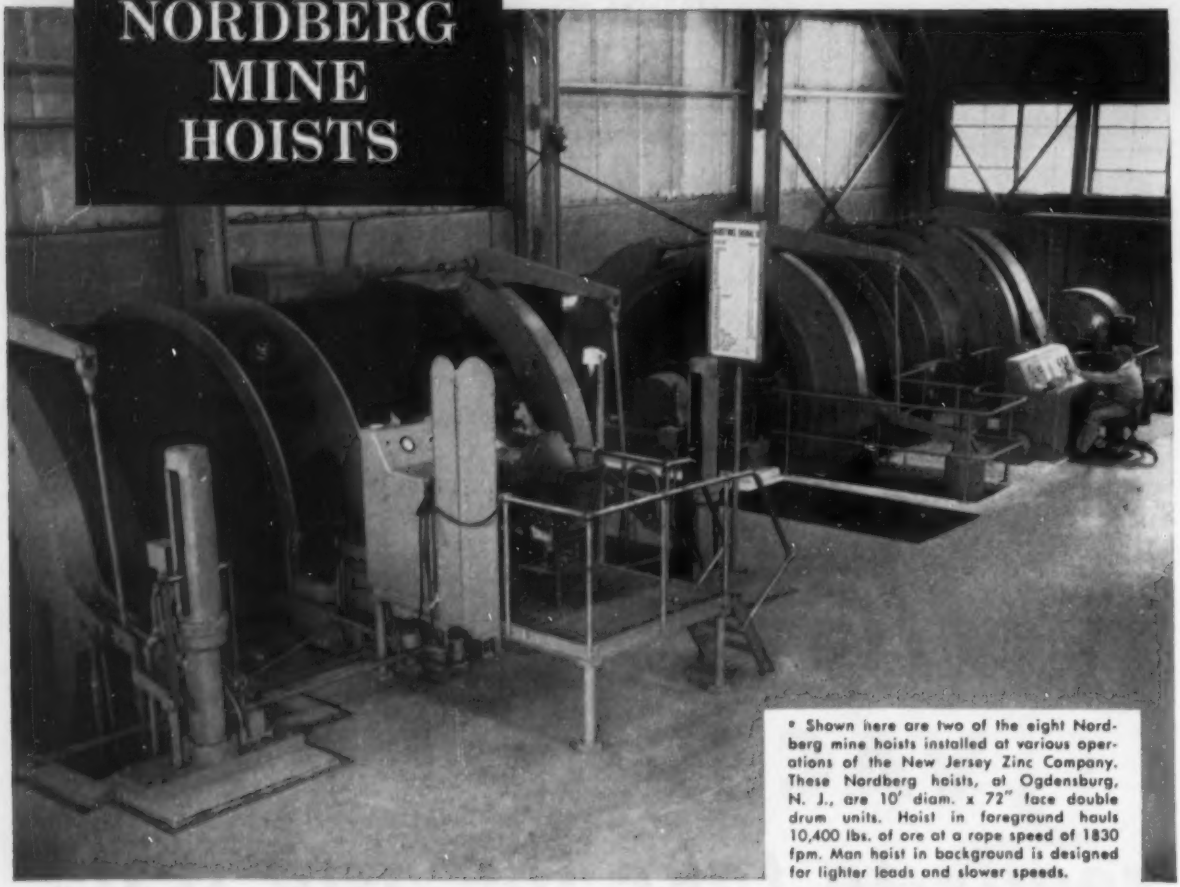

• Shown here are two of the eight Nordberg mine hoists installed at various operations of the New Jersey Zinc Company. These Nordberg hoists, at Ogdensburg, N. J., are 10' diam. x 72" face double drum units. Hoist in foreground hauls 10,400 lbs. of ore at a rope speed of 1830 fpm. Man hoist in background is designed for lighter loads and slower speeds.

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Write for further details, or ask for Bulletin 190. *NORDBERG MFG. CO., Milwaukee, Wisconsin.*

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Mine, Inc. cut a 12-foot ore zone. An AEC log of the upper six feet indicated values from 0.20 to 0.70 percent uranium oxide. The ore zone was entered at a depth of 128 feet. Since then, deeper drilling has cut three mineralized zones, the first zone at 97 to 99 feet, the second at 124 to 129 feet, and the third at 130 to 136 feet. *Corky Smith Drilling Company* of Spokane has the contract, and a wagon drill is being used. William D. Weaver, general mining consultant, is directing the operation.

Daybreak Uranium, Inc. has acquired a one-fourth interest in prospecting permits covering sections 23 and 26 about midway between the *Midnite* uranium mine and Daybreak's *Lowley* and *Bair* leases in the Spokane Indian Reservation. *Yukon Oils, Ltd.* of Calgary, Canada, also has a 25 percent interest. Individuals in the Spokane area own the remaining 50 percent. Daybreak will do the prospecting and mining work. Stripping of a radioactive ridge was planned first. Development of ore uncovered on the Lowley and Bair leases has been resumed following a shutdown caused by snow and cold. Shipments from the Daybreak open-pit autunite mine in the Mount Spokane district were to be resumed when spring road restrictions were lifted. James W. Fox of Opportunity is president, and Kae Sowers is secretary-treasurer.

Dawn Uranium & Oil Company, at last report, was awaiting lifting of road restrictions to start ore shipments from *Target Uranium Company's Smith* lease in the Mount Spokane district. More than 1,000 tons had been stockpiled from open-pit mining. Following completion of an initial 200-ton shipping contract with the U.S. Atomic Energy Commission, the company planned to ship to *Vitro Uranium Corporation* of Salt Lake City. Vitro currently is buying all ore produced at the nearby *Daybreak* uranium mine. C. R. Echlin of Spokane is Dawn secretary-treasurer.

Test drilling of a 480-acre tract in the Mount Spokane uranium district is planned by *Eastern Star Mining Company* of Wallace, Idaho. The firm, formerly active in the Burke, Idaho district, was reactivated to explore for uranium on the *Collett* lease, 2½ miles north of the producing *Daybreak* mine. I. F. Thompson of Spokane is company president.

General Uranium, Inc. of Spokane has been incorporated with $600,000 capitalization by State Representative Edward F. Harris and Donald A. Ericson of Spokane, and James L. Simpson of Coeur d'Alene.

Rayrock Uranium Company of Spokane, Washington will undertake exploration and development of *Tungsten Uranium Mines'* 200-acre *Thompson* lease in the Mount Spokane District under a 50-50 operating agreement. Rayrock, organized last summer, has about 700 acres under lease in the area. Carl Larson is president and Wayne Franks, secretary-treasurer. C. A. Voight is president of Tungsten Uranium, and Wellman Clark is secretary-treasurer.

A minimum of 300 feet of wagon drilling is planned by *Sunset Mines, Inc.* at its uranium prospect near Kettle Falls, Ferry County, Washington. A number of outcroppings are believed to contain finely divided uraninite or pitchblende. C. B. Merritt of Seattle is secretary.

Curite, a rare uranium mineral first noted in the Belgian Congo, has been identified as occurring in Pend Oreille County, Washington. Identification of the hydrous uranium-lead oxide was made for *North Star Uranium, Inc.* by Dr. Mark Bandy, mineralogist for *Utex Exploration Company*, Moab, Utah. The brown, earthy mineral was found in small pockets in argillite overlying granite. Autunite mineralization was found in the surrounding rock. Only trenching has been done at the site so far.

Pend Oreille Mines and Metals Company is planning to increase its output of lead-zinc ore this year by more than 50 percent. Production in 1955 totaled 503,391 tons. The firm's new mill on the east side of the Pend Oreille River near Metaline Falls, Pend Oreille County, Washington, has a capacity of 2,400 tons daily. The old west side plant has a capacity of 700 tons. Jens Jensen of Spokane is president.

J. H. Zickefoose of Spokane has recorded the *Green Spark* claims 1 to 8 in section 31, township 34, range 45, Pend Oreille County, Washington. He previously filed on six other claims in the county.

C & D Minerals, Inc. has been incorporated for $150,000 to develop uranium claims in Stevens County, Washington. Incorporators were Dale Lanphere of Spokane, A. P. Clark of Loon Lake, and Oliver Dilling of Connell.

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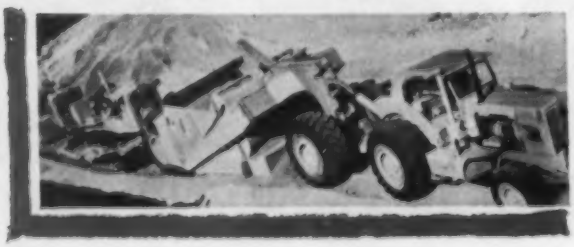

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Idarado Has Good Year; Reserves Up 800,000 Tons

Idarado Mining Company mined and milled 274,550 tons of ore at its Red Mountain mill, Ouray County, Colorado in 1955. Of this ore, 60.4 percent (165,947 tons) was from the Black Bear vein, and the remainder (108,603 tons) from the Argentine vein. The ore averaged 0.08 ounce gold, 1.88 ounce silver, 2.09 percent lead, 0.69 percent copper, and 3.33 percent zinc. Operating profit from this ore after depreciation and depletion was $1,395,099.

Development footage on the Argentine vein was 1,725 feet, and 1,298 on the Black Bear. Tons milled per operating shift was 4.24, and tons milled per underground shift 6.91.

At the wholly owned subsidiary, Telluride Mines, Inc., the $1,206,414 mill enlargement and modernization program was completed during the year. Mine development totalled 6,274 feet, and stope preparation 1,395 feet. This cost $1,045,188 but was very successful in that good grade ore was developed down dip from 1200 level over a strike length of over 6,000 feet. Ore reserves at both properties were increased by about 800,000 tons during the year.

National Lead Operates Monticello Uranium Mill

The National Lead Company has taken over the operation of the government-owned uranium processing mill at Monticello, San Juan County, Utah which had been operated by The Galigher Company of Salt Lake City since 1949. Extensions of the current contract expired on March 31, 1956, and The Galigher Company advised the Commission it did not wish to renew the contract because of its desire to devote more time to expanded operations in the fields of engineering design and metallurgical consulting.

The National Lead Company has had wide experience in processing metal bearing ores and it operates many plants for the recovery of metals from various types of ore feed. National Lead is a contract operator of the Commission's Raw Materials Development Laboratory at Winchester, Massachusetts, and the ore-testing pilot plant at Grand Junction. In this pilot plant, National Lead assisted in working out the design for a recent expansion of the Monticello mill and in developing the resin-in-pulp process in use there since last November. This new unit was brought into successful operation by The Galigher Company, National Lead, and the Commission, with National Lead coordinating the pilot plant work to mill operation.

The Monticello uranium mill is the only one owned by the Government. There are eight privately owned mills operating in western states, and four more in various stages of construction.

AEC Considers Requests For Wyoming U_3O_8 Mills

The United States Atomic Energy Commission is currently considering two applications for permission to construct uranium processing plants in central Wyoming. Utah Construction Company and Lucky Mc Uranium Corporation, joint owners and operators of the famed Lucky Mc uranium deposit in the Gas Hills area of central Wyoming, seek permission to construct and operate a 750-ton-per-day uranium mill in the Gas Hills area, while Lost Creek Oil & Uranium Corporation has submitted a proposal for construction and operation of a 450-ton-per-day mill at Riverton.

The Utah Construction-Lucky Mc proposal followed six months of extensive drilling and metallurgical testing. The companies report sufficient ore reserves, on the property and under contract with adjacent producers, to warrant the $5,000,000 mill. Metallurgical studies were recently completed at Battelle Institute and these results are being studied by the AEC.

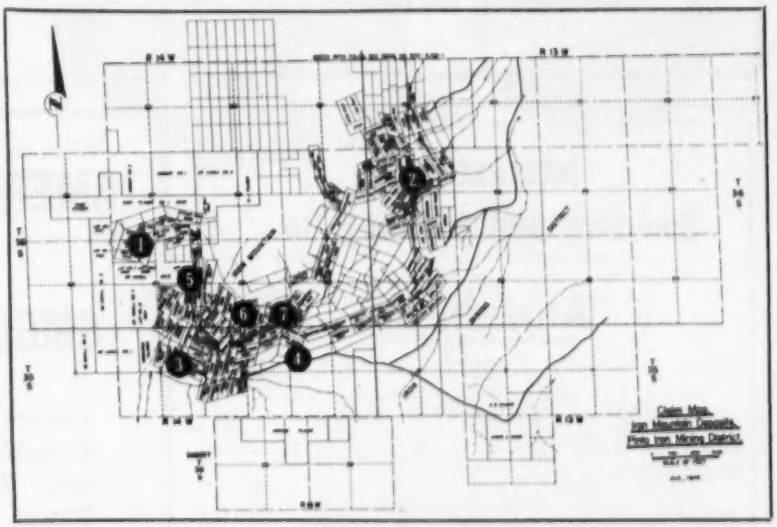
Lost Creek, whose headquarters are in Rawlins, Wyoming, recently reported ore bodies blocked out on its property in the Crooks Gap and Pumpkin Buttes areas of Wyoming, and assignments of ore from other central Wyoming producers. Amenability tests were made on the firm's ore by the Colorado School of Mines Research Foundation, which also designed a flowsheet and computed estimated milling costs. Western-Knapp Engineering Company is drawing preliminary plant designs.

COLORADO

Idarado Mining Company will dissolve *Telluride Mines Inc.*, its wholly owned subsidiary, and the mines and mill at Telluride, Colorado will become the *Pandora Division* of Idarado. A $2,000,000 mill expansion and mines improvement program has been carried out over the past two years since Idarado acquired Telluride, which is expected to cut operating costs considerably. Actual Telluride milling was resumed on January 7 of this year.

Earl Clifford and Ed Walby of Silverton, Colorado have received a $13,000 DMEA loan to explore for tungsten on the *Tin Cup* and *Gypsy* lode mining claims in the Cement Creek district, about two miles above the Yukon Tunnel on the same slope. Plans call for 275 feet of drifting and some crosscutting.

Continental Uranium, Inc., through a subsidiary, has acquired four uranium claims on Flat Top Mesa from *Silver Pick Uranium Inc.* and *Thunderbird Uranium Company*. The claims comprise about 80 acres, and are near Calamity



U. S. Steel Expands Utah Iron Ore Holdings

The United States Steel Corporation reportedly has paid $1,000,000 for 18 iron ore claims in the Iron Mountain district west of Cedar City, Utah. Iron mining is carried out in the district through a subsidiary, Columbia Iron Mining Company. The sale was made by Mr. and Mrs. Cleo Wood of Hurricane; Mr. and Mrs. Melvin Murie; Mr. and Mrs. Rex Murie; and W. C. and Ernest Murie of Cedar City. Location of the claims, all in the Rex orebody, is shown on the map above, together with other major orebodies of Columbia Iron and the Colorado Fuel and Iron Corporation. They are: No. 1, The Rex; No. 2, CF&I's Comstock mine; No. 3 CF&I's Duncan mine; No. 4, CF&I's Blow Out deposit; No. 5, Columbia's Burke mine; No. 6, Columbia's Pinto mine; and No. 7, Columbia's Black Hawk mine. Iron ore in the district occurs chiefly as replacements in the Jurassic Homestake limestone which surrounds monzonite laccoliths. Other orebodies are replacements of limestone roof pendants, replacements of limestone inclusions in the monzonite, and in fissure veins in the monzonite. The ore is hematite with 10 to 47 percent magnetite. It is fairly soft and easily crushed. Sulphur and phosphorus content is low. However, erratic occurrences of copper and iron sulphides are noted adjacent to fissures. Both Columbia and CF&I mine over a million tons of ore in the district yearly. Columbia ore is railed to and furnaced at the Geneva Works near Provo. CF&I ships to its Minnequa Works at Pueblo, Colorado.

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Mesa in the Gateway mining district 40 miles southwest of Grand Junction, Colorado. The arrangement with the two firms includes payment in Continental stock, plus royalty on all ore sold in excess of $200,000 in value.

Pumping operations are underway at the *Silver Ledge* mine near Silverton, Colorado where *TechSer Company* and *Black Mining Company* are attempting to unwater Level Three. This 50-year-old mine has produced lead and zinc in the past, with some silver values.

The *Callahan Zinc-Lead Company* has applied to the Defense Minerals Exploration Administration for a loan to carry out additional work on two possible uranium-bearing properties near Gunnison, Colorado. The firm conducted active exploration on the property in 1955, and it showed sufficient promise to justify further work. Callahan would use the loan for diamond drilling on these properties which cover about 2,000 and 5,000 acres, respectively.

The *Third Annual Mining Exposition and Uranarama* will be held in Grand Junction, Colorado on May 10, 11, and 12, under the sponsorship of the *Uranium Ore Producers Association*. The UOPA will hold its annual election of officers and annual banquet during the three-day period. On May 10, in conjunction with the Exposition, the *Uranium Institute of America* will have its first general meeting. L. A. (Kim) Theobold is general chairman of the Exposition.

H. E. Rhoades of Jamestown, Colorado reports that 22 mines in Boulder County, Colorado have been leased to the *Mountain States Uranium Inc.* and they are now shipping from the properties. Mr. Rhoades also reports that he has leased three mines to Clark and Busley who have shipped six cars to the *Vitro Uranium Corporation* in Salt Lake City, Utah.

UTAH

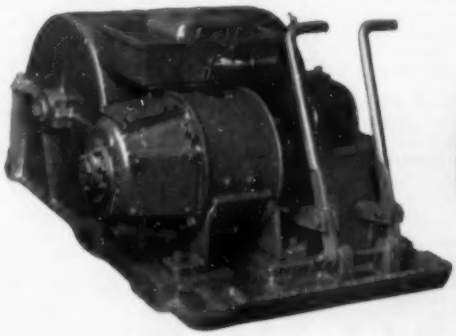
Ute Milling Company, a subsidiary of Floyd Odlum's *Atlas Corporation*, has submitted a proposal for construction of a mill in the Big Indian Wash area of San Juan County, Utah to the *United States Atomic Energy Commission*. A number of Big Indian producers are reported to have agreed to ship their uranium ore to the Ute operation for processing. Among these are the *Homestake Mining Company*, through its subsidiaries—*Little Beaver Mining Company* and *La Sal Mining and Development Company*; the *Radon* mine operated for *Federal Uranium Corporation* by *Hecla Mining Company*; *Hidden Splendor Mining Company*; *Lisbon Uranium Corporation*; and *Cal-Uranium Corporation*. Some of these reserves, reportedly, had been promised to the large mill being constructed at Moab by *Uranium Reduction Company*.

New Park Mining Company has encountered lead-silver-zinc at the east end of the *New Park* mine on the 1,780-foot level, as expected. The ore body is in step-faulted limestone and extends up to the 1,600-foot level where indications of bedding were first encountered. The company's operations are in the Park City district of Utah.

United Park City Mines Company reported a profit for 1955 of $267,948, compared with a net loss of $182,995 in 1954. Improvements in the metal price situation were the major factor. The firm was formed in 1953, through a merger of *Silver King Coalition Mines Company* and *Park Utah Consolidated Mines Company*, to operate lead-zinc mines in the Park City district which had been closed down because of the low prices of lead and zinc. Production did not get underway until the last four months of 1954. In 1955 79,363 dry tons of ore were produced, from which 2,900 ounces of gold, 344,287 ounces silver, 12,970,969 pounds lead, 16,815,181 pounds zinc, and 193,022 pounds of copper were recovered. Some 21,160 feet were driven in development work, 6,683 feet of diamond drill holes sunk, and 20,139 feet of percussion drill exploratory hole.

The *Lucky Strike* group of eight claims on Burmley Ridge, nine miles east of the Moab airport, have been acquired by *Inspiration Lead Company*, Spokane, Washington. Work was scheduled to start immediately. At the firm's 25-claim *Bee* group in the Big Indian district of Utah, 7,844 feet of drilling has disclosed four mineralized areas and additional drilling is planned. The company has drilled about 1,500 feet of hole

Headquarters for "BROWNIE" proved mine hoists



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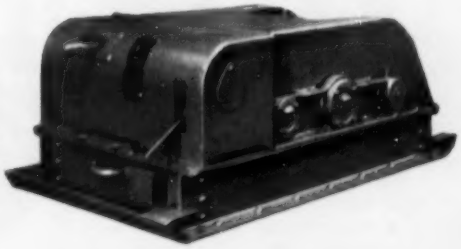

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on its 37-claim *Cherokee* group west of Blanding. W. T. Anderson, Spokane, is secretary-treasurer and general manager.

The *D & R Uranium Corporation* of Las Vegas, Nevada has completed the purchase of 39 mining claims in the area of the junction of the Colorado and Green Rivers in San Juan County, Utah. Work has been started on an air strip and access road, and it is hoped that production can be started this summer. An office has been set up in Moab to handle operations.

Utaco Uranium, Inc. reports that its *Allen No. 2* mine 65 miles west of Blanding in Red Canyon, Utah, is now producing 50 tons of ore daily, and shipping to the AEC mill at Monticello. Utaco holds the operating lease on the property which is owned by *Lakeside Monarch Mining Company*.

The sale of 101 uranium claims in the Dirty Devil River area of southeastern Utah was announced by Harvey S. Mecham who first located the claims. He and his associates have sold the *Sad Sack, Happy Canyon,* and *Castle Rock* claims to the *Judella Uranium Company* of Regina, Canada for $11,000 cash, and a 25 percent royalty on the gross with $10,000,000 as the maximum payment.

Delhi-Taylor Oil Corporation of Dallas, Texas continues to show an active interest in the potash possibilities of Grand County, Utah. The firm has taken out numerous prospect permits in the area, and reportedly has converted two to mining leases.

WYOMING

A large company entering the Wyoming uranium activity for the first time is the *O. A. Sutton Investment Company* of Wichita, Kansas, which has purchased numerous claims in the Crooks Gap area.

The *Bridger Mining Company* has started production of uranium from its properties in the Sheep Mountain area of central Wyoming, 25 miles southeast of Lander.

Lisbon Uranium Corporation of Salt Lake City, Utah, has purchased a large group of uranium claims in the Crooks Gap area of central Wyoming, its first acquisition off the Colorado Plateau.

Construction of some 50 miles of a uranium access road from near Riverton to the Gas Hills in central Wyoming is expected to start this spring following furnishing of the last section of right-of-way by Fremont County and the Shoshone and Arapahoe tribes of the Wind River Reservation.

Bentonite Corporation of America reportedly will build a $60,000 processing plant near Thermopolis, Wyoming this spring. The firm is said to have an option on 1,600 acres for exploration and for a mill site north of Thermopolis.

Little Star Uranium Company of Casper, Wyoming has acquired the *Universal Mining and Milling Company* through a merger.

Union Pacific Railroad Company has signed a contract with "an outstanding mining company" providing for a quarter section by quarter section survey of 4,500 square miles of its lands in the Iron Mountain area of southeastern Wyoming. It is believed that there are some 230,000,000 tons containing 20,000,000 tons of titanium. According to Union Pacific president A. E. Stoddard, the two firms have arrived at a definite percentage of ownership and development is now awaiting a suitable formula for extracting the titanium from the ore.

Three Alexandria, Minnesota prospectors—Karl J. Anderson, George E. Fairfield, and H. J. Beach—were winners in a claim-jumping suit brought by Globe Mining Company of Casper, Wyoming over a group of uranium claims in the Puddle Springs section of the Gas Hills uranium area of central Wyoming. District Court Judge Franklin B. Sheldon, who presided at the trial in October, ruled in early February that Globe Mining Company, owned principally by Jenkins & Hand, a firm of Casper, Wyoming geologists and mining men, did not have valid claims, and that therefore the three Minnesota men were entitled to enter upon the land and locate mining claims. The judge explained his ruling in a long, detailed "Findings of Fact" that brought the case widespread attention by mining men and attorneys, who said the decision gave added strength and respect for mining laws. The plaintiffs appealed the decision to the Wyoming Supreme Court.

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Inspiration Gets Rapid Tax Write-Off for Mine

A certificate for rapid tax amortization has been granted to Inspiration Consolidated Copper Company for a part of its $8,500,000 mining project at the Christmas mine near Winkelman, Arizona. The certificate, issued by the Office of Defense Mobilization, covers 25 percent of the cost of the project, and means that the new mining facilities may be depreciated for tax purposes over a five-year period, instead of the customary 20 years or more.

Exploration and development work at the Christmas mine produced gratifying results in 1955, and confirmed the presence of ore, both near and far below the limit of the present workings. As a result, surface drilling is being conducted to determine a suitable production shaft location and, when located, sinking will begin, to be followed as soon as possible by construction of surface facilities. Inspiration reports that every effort will be made to bring the property into production as quickly as possible and that the tentative "time-table" calls for beginning of installation of headframe and hoisting equipment during 1956, followed by work on mill building, equipment, service facilities, townsite, etc., with completion in late 1958 or 1959. Expenditures for driving underground openings and diamond drilling from surface and underground were reported as $983,850 in 1955 and $345,362 in 1954.

The year 1955 was the first full year in the history of the company's operations at Inspiration, Arizona, that entire production of ore came from surface mining. Underground activities were restricted to the maintenance and operations of shafts and opening necessary for the underground movement of ore from the open pit. Inspiration mined 3,731,027 tons of ore, averaging 0.974 percent copper, and stripped 11,517,613 tons of overburden, or 3.09 tons stripped per ton of ore mined. Copper production totaled 76,228,125 pounds, compared to 68,192,316 pounds in 1954. The company estimated that its new metallurgical plant, to provide the so-called dual process of recovery, will be completed by December 1, 1956. The over-all cost of the improvement is estimated at $5,660,000. Adoption of the dual process is expected to increase the productive capacity of the ore-treatment plants to 85,000,000 pounds of copper annually, and make it profitable to mine and treat lower grade ores, thus adding about 350,000,000 pounds of recoverable copper to the ore reserves.

The *Mineral Mountain Mining and Milling Company*, with lead-silver properties in the Mineral Hill mining district of Pinal County, Arizona, has acquired the milling plant of *Goldfield Mines, Inc.*, north of Apache Junction. According to L. Lee Boyer, vice-president, Mineral Mountain plans to accept custom ores to supplement the ore supply from its own properties. First ore to be treated will come from old dumps and from development work. The Goldfield mill, with jigs, tables, and flotation units, has a daily capacity of approximately 100 tons. Principal assets of Mineral Mountain Mining and Milling Company consist of 11 unpatented mining claims and one patented claim located approximately seven miles south of Superior and 18 miles north of Florence, Arizona. Development work includes numerous shallow workings and two 100-foot inclined shafts. Among the claims are the *Woodpecker*, *Old Badger*, *Gold Coin*, *Orphan Boy*, and *Hall-Gorman* group. Officers of the company are O. L. Dawson, president, Los Angeles; L. Lee Boyer, vice-president, Tempe; and C. M. Miller, secretary-treasurer, Tempe.

Production from the Morenci Branch, *Phelps Dodge Corporation*, Morenci, Arizona, totaled 248,826,556 pounds of copper during 1955. The total tonnage removed from the Morenci open-pit mine was 49,048,202 tons—an average per working day of 158,732 tons. Of the total tonnage moved, 15,899,410 tons were ore and 33,148,792 tons were waste and leach material. The ratio of waste and leach material to ore was 2.08, compared to 2.06 in 1954. In addition to the copper output, 891 tons of molybdenite concentrates were recovered as a by-product from the copper concentrates. New equipment acquired for the Morenci Branch included thirteen 1,750-horsepower Diesel locomotives to replace the trolley-electric locomotives equipped with Diesel auxiliaries.

Facilities to recover the small molybdenum content of the copper concentrates are being installed by *American Smelting and Refining Company* at its Silver Bell mine, northwest of Tucson, Arizona. The company expects this section of the plant to be in operation in the second quarter of this year. Silver Bell, in 1955, had its first full year of production which resulted in an output of copper concentrates containing approximately 21,000 tons of recoverable copper.

The *Emerald Isle* copper property, near Chloride, Arizona, is being operated by C. G. Patterson of Chloride. At present, he is mining and shipping better than a carload of ore a week from the 100-foot level, and is employing a crew of 10 to 12 men. Earlier, he shipped about 3,000 tons of ore from the old dumps.

During 1955, *Phelps Dodge Corporation* removed 12,447,179 tons of material at the *Lavender* open-pit mine at Bisbee, Arizona. Of this total, 4,433,218 tons were ore, 3,538,246 tons were leach material, and 4,475,715 tons were waste. The ratio of waste and leach material to ore was 1.81. The Lavender pit is producing from 14,000 to 15,000 tons of ore per day, compared with the 12,000 tons projected. At the current rate of ore production, the company stated, the remaining life of the mine is about eight years. Copper production from the Lavender open-pit mine in 1955—the first full year of production—amounted to 59,862,955 pounds, compared to 17,056,589 pounds in 1954 following the official start of production on September 1, 1954.

Production by the *Ray Mines Division, Kennecott Copper Corporation*, Ray, Arizona, amounted to 48,983 tons in 1955, compared to 40,259 tons in 1954. The copper content of the Ray ore was 21.06 pounds per ton of ore mined. Except for precipitate copper obtained from leaching the caved areas of the old underground workings (7,546 tons in 1955) all production is coming from the open-pit operations as underground mining was terminated January 28, 1955. Actual construction work on the $5,000,000 leach-precipitation-float unit at the concentrator at Hayden was started last December, and completion

Stripping Proceeds at Boron Open Pit

Stripping at the open-pit borax mine of Pacific Coast Borax Company at Boron, California is progressing at the rate of 450,000 cubic yards per month. The contract calls for removal of 10,000,000. Isbell Construction Company of Reno, Nevada has the contract for this phase of the $18,000,000 expansion program. In the picture above, taken by *Mining World*'s associate editor early in April, a ripper can be seen at the far right loosening overburden. In the center, a Caterpillar D-8 and a Caterpillar D-9, in tandem, are push-loading a Euclid S-18 scraper. The loaded scraper then proceeds east to an access ramp leading out the pit. To date most of the overburden has been used to ring the tailing disposal area. W. H. Wamsley is mine superintendent at Boron, and J. M. Gerstley is president of Pacific Coast Borax. The stripping project was described in the March 1956 issue of *Mining World* on page 44.

is scheduled for the first quarter of 1957. Pilot plant testing at the company's research center indicates that the new process will increase the copper recovery by 12 percent. In addition, a method has been developed for producing the sponge iron needed in the process from the pyrite contained in the mill tailings.

Western Mining and Exploration Company has been awarded a DMEA contract for uranium exploration in Gila County, Arizona. Total estimated cost of the project is $50,640, with government participation of $37,980. Company holdings include the *Black Brush* group of eight claims on which the DMEA project will be conducted, the *Grind Stone* group of seven claims, and the *April Fool* group of seven claims. All are located along Cherry Creek in the Sierra Ancha Mountains of Gila County. According to C. A. Saylor, president of the firm, exploration work will include approximately 1,200 feet of drifting and crosscutting, 1,000 feet of rim stripping, 1,400 feet of long-hole drilling, and 1,500 feet of access road construction. Frank Lewis, mining engineer of Globe, who assisted in planning the DMEA project, will supervise the exploration work.

Extensive gold placer operations are planned on the *Whitsett* claims near Waggoner, Yavapai County, Arizona, by two new corporations. The *KPP Mining and Lumber Corporation* and the *Western Transportation and Mining Company* have been formed by a group from Los Angeles, including Ellis Patterson, D. E. Knieper, L. M. Marsh, Jack King, John Hall, and William D. Price. The Whitsett claims cover about 600 acres on the Hassayampa River and Mill Creek. Six men will be employed to start the activity. Actual mining will consist of dry land dredging with a dragline feed, using Pan-American jigs as recovery units of 62-ton capacity.

The *Pinafore* mine at Bagdad, Arizona has been taken over by *McFarland and Hullinger* of Toole, Utah, who also operate the *San Xavier* mine near Tucson. A development tunnel is being driven to explore the zinc-copper property. K. L. Erickson is in charge of the work, employing a crew of six to eight men.

The *Siskon Corporation* has exercised its option to purchase the *Old Reliable* copper mine and 100-ton flotation mill located about 10 miles northeast of the *San Manuel* mine in Pinal County, Arizona. A crew is now making preliminary preparations for tests to determine if leaching of the ore in place is practical.

A leaching operation at the old *Calaveras* mine, Copperopolis, California, at last report had recovered seven tons of copper cement assaying 45 percent copper. The work is being done by *Daybreak Uranium, Inc.* of Opportunity, Washington. The company also was preparing to ship three cars of copper ore left behind by former operators when the mine closed early in the 1930's. James W. Fox is president.

Kaiser Steel Company has obtained rights to perform exploratory work on several iron ore mining claims of *Bessemer Mines Inc.*, located about 30 miles east of Lucerne Valley in California. The rights also include options to lease or purchase the property for about $250,000. Kaiser has until February 14, 1957 to explore the claims and determine their worth. Lease arrangements provide for a 15-year period during which Kaiser Steel would pay from 15¢ to 50¢ a ton for ore shipped, depending upon the iron content of each shipment. Minimum monthly payments of $1,750 will be paid during the existence of such a lease. While the amount of the ore is not expected to be large, it is expected that the quality will be high enough to be used as a source of "lump" open hearth ore.

Idaho Maryland Mines Corporation has placed its new tungsten mill in operation at its property in Grass Valley, California. The mill has a rated capacity of five tons per hour, and the management hopes to treat 60 tons a day on a two-shift basis. Considerable savings are expected to result since it will no longer be necessary to ship tungsten ore to Lovelock, Nevada for milling.

The *Bunker Hill Company* (formerly the *Bunker Hill and Sullivan Mining and Concentrating Company*) has opened new offices at 660 Market Street, San Francisco, California. President John D. Bradley cited as reason for the move the company's anticipated expansion. The

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head office for this Kelogg, Idaho firm had been in the Crocker Building of San Francisco for more than 50 years.

The government is accepting sealed bids in triplicate until 11 a.m. May 15 for the sale and removal of the *Big Blue Mine* mill buildings and equipment located within the area of the Isabella Dam Reservoir near Kernville, California. Bid forms may be obtained from the Office of the District Engineer, Sacramento District, Corps of Engineers, U.S. Army, 1209 8th Street, Sacramento.

Kaiser Chemicals Division of *Kaiser Aluminum & Chemical Corporation* will undertake a $3,000,000 expansion program which will substantially increase its capacity to produce its refractory and magnesia products. New facilities will be added to two of the division's plants—the Moss Landing, California seawater magnesia plant and the Columbiana, Ohio basic refractories plant now under construction. New equipment for the Moss Landing plant will double the present seawater handling capacity and will increase by more than 50 percent its capacity to produce periclase, which is used in basic refractories for the high temperature furnaces of the steel, cement, glass, and copper industries. A large new rotary kiln will be installed at the seawater plant. This will have a capacity of approximately 150 tons of magnesia products per day, bringing total daily kiln capacity to approximately 375 tons a day.

NEVADA

A substantial interest in the *Mount Wheeler* mine in Nevada in which *American Zinc, Lead and Smelting Company* has a 22 percent interest, has been optioned to the *Cyprus Mines Corporation*. Major development operations are being carried on and the development objectives will be reached and fully explored by the end of 1956.

National Lead Company and the *Allegheny Ludlum Steel Corporation* have announced plans for a 67 percent expansion of sponge production at the jointly owned *Titanium Metals Corporation of America* plant at Henderson, Nevada. Output will be increased from 3,600 tons per year to 6,000 tons per year. Ingot melting facilities will also be expanded. The completed facilities should be ready for production toward the end of this year.

Eureka Corporation, Ltd., which is exploring the 950 level at its property near Eureka, Nevada, reports that the crosscut has been driven about 350 feet south from the TL shaft. Mineralization previously indicated in inclined holes from the 850 level was encountered in the crosscut on the 950. This will be advanced south to provide exploration for a number of other parallel mineralized zones. Initial drilling immediately south and west of the TL shaft is now underway from the 950 level. Crosscutting has also been started on the 1,050 level south from the shaft.

Walter Low of Winnemucca, Nevada reports he has located a mercury deposit 50 miles south of Winnemucca in the Mt. Tobin area. According to Mr. Low, surface operations indicate it may be ex-

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tremely rich and that, reportedly, a 20-foot tunnel yielded an ore vein four feet wide. A small retort furnace is now in operation. Plans are underway for a spring development program. The property is owned by Mr. and Mrs. Low and F. J. Miller.

The *J. R. Simplot Company* continues to be active in Nevada. The mining division started the 1956 season with experimental blast hole drilling at the silica deposit at Overton where approximately 30,000 tons were broken with 19 holes. The experiment proved that drilling, blasting, and mining costs can be materially reduced. In the Death Valley area, exploration was carried out on gypsum and salt deposits. Both this exploration and the silica drilling have been under the direction of Phill Peterson. At the company's iron mining operations in Eureka County, 117,000 tons of iron ore had been mined as of January 25 since the recently renewed activity there for export to Japan. Sumner Robinson and John Kobe are in charge.

According to George H. Snyder, president of the *Bristol Silver Mines Company* at Pioche, Nevada, a lessee has hit an ore body in the firm's lead-zinc-silver mine near Pioche. Jack Buehler is said to have made the discovery in the east section of the mine on the 500-foot level. Six cars reportedly have been shipped to the *International Smelting & Refining Company* plant at Toole, Utah where they are said to have assayed 27.7 ounces silver, 6.6 percent copper, 4.5 percent lead, and 4.5 percent zinc per ton.

NEW MEXICO

Mid-Continent Uranium Corporation has let contracts and work has started on sinking of a shaft on the *All States* property in McKinley County, New Mexico. According to "Petroleum Information," a pair of shafts will be sunk to straddle the ore body which lies at a depth of 400 feet—one shaft for haulage and the other for personnel access. *Minerals Engineering Company* of Grand Junction, Colorado is prime contractor. Each shaft reportedly will be sunk by churn drill and will be 36 inches in diameter. Shipments are expected to start in July, and maximum monthly tonnage will be about 1,500 tons.

McKenzie and Whittle set a new record in shaft sinking in the Carlsbad Basin of New Mexico when crews sunk both No. 1 and No. 2 shafts at *National Potash Company's* property 300 feet in 30 working days. No. 1 shaft from 907 feet to 1,207 feet, and No. 2 from 807 to 1,107 feet in the period from February 24 to March 29. Three work shifts were maintained on a six-day week basis. These figures compare with the best footage of 157 feet previously reported on any of the 14 shafts in the Basin, according to James A. Lilly, project engineer. Actual shaft sinking is expected to be completed about June 1.

Foley Metals Corporation has been organized by the Foley group, *Rio de Oro Uranium Mines*, and *United Western Minerals Company* to negotiate with the *United States Atomic Energy Commission* regarding establishment of a uranium mill in the Ambrosia Lake area of New Mexico.

Cities Service Oil Company is reported to be ready to start uranium exploration on a lease from *Texas National Petroleum Company* in Canon de San Diego grant, Sandoval County, New Mexico. Mineral rights were obtained from *New Mexico Timber Company*.

Tejano Mining Company will undertake open pit operations at the old *Austin Amazon* copper mine, 11 miles west of Tyrone, New Mexico, which has been idle for many years.

Francisco Mining Company has started mining operations on a claim in the old Senorita mining district near Cuba, New Mexico. Initial operations are on an old dump, but plans call for underground mining later.

H. B. George, vice president of the *Mercury Uranium and Oil Co.* at Albuquerque, New Mexico, said that the company intends to start drilling at the old *San Pedro* mine near Golden, a property first worked by Spaniards more than two centuries ago for copper and gold. The mine is owned by Col. Charles Williams of Santa Fe and Charles Bradbury of Florida. It was last worked during World War II.

Potash Company of America was awarded $46,066 in its long-standing suit against the *Duval Sulphur & Potash Company* for infringement on a patented flotation process. The suit was for $105,000. The basis of the ruling was 10c per ton during the period that the process was used. Both firms operate in the Carlsbad area of New Mexico.

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TEXAS

Climax Molybdenum Company owns a 100 percent interest in a company known as *San Antonio Mining Company Inc.* which has delimited and blocked out a low-grade uranium deposit in Texas. According to Climax, the firm has a contract to sell to the AEC.

United Western Minerals Company reports that preliminary negotiations have been entered into with representatives of *Vitro Corporation of America* and the *Hill-Darlington Company* of New York with the object of erecting a chrome mill in Corpus Christi, Texas. United Western would participate in financing.

Aluminum Company of America will build a $45,000,000 plant at Point Comfort, Texas to produce alumina. Construction will start immediately, and initial production is planned early in 1958. A navigation channel will permit Alcoa to move its bauxite directly to the plant site by ship. A $3,000,000 ore-loading dock will be built as part of the project.

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1—6' x 22" Hardinge Conical Pebble Mill
1—3' x 8' Marcy Rod Mill

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1—105 CFM Ingersoll-Rand
1—125 CFM Jaeger
1—210 CFM Worthington
1—310 CFM Sullivan
1—310 CFM Gardner-Denver

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1—3½ Ton Atlas
1—4 Ton Westinghouse
1—4 Ton Ironton
2—6 Ton General Electric
1—6 Ton Mancha
2—7 Ton General Electric
1—7 Ton Atlas
2—8 Ton Goodman
3—8 Ton Ironton
2—8 Ton General Electric
4—10 Ton Atlas

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1—5 Ton Jeffrey
2—6 Ton Goodman
2—8 Ton Goodman
3—10 Ton Jeffrey
1—13 Ton Jeffrey
1—13 Ton Goodman
3—15 Ton Jeffrey

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1—FM-2 Ingersoll-Rand
2—FM-3 Ingersoll-Rand

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6—23 Cu. Ft. Truax rocker dump
4—27 Cu. Ft. Koppel rocker dump
6—2 Cu. Yd. Koppel rocker dump
2—2 Cu. Yd. Insley rocker dump
12—84 Cu. Ft. Truax rocker dump
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3—5 Cu. Yd. Western side dump
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1—8H—42" Jeffrey Aerodyne
1—10'—Jay La-Del Axialflow

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1—1½KW U.S. Light Plant A.C.
1—3 KW Delco Light Plant D.C.
1—4 KW Kohler Light Plant A.C.
1—5 KW Marble Card Light Plant D.C.
1—10 KW Westinghouse Light Plant A.C.
2—15 KW Waukesha-Century Diesel Generator
1—30 KW Buda-Century Diesel Generator
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3—3" Goulds centrifugal pumps
1—4" Aurora centrifugal pumps
2—5" Ingersoll-Rand motor-pumps
1—7" Fairbanks-Morse centrifugal pump
1—10" Sweby centrifugal pump
2—1½" Economy 4 stage centrifugal pumps
1—2" Union 6 stage centrifugal pump
4—2½" Pennsylvania 4 stage centrifugal pumps
1—3" Allis-Chalmers 3 stage centrifugal pump
2—5" United 6 stage centrifugal pumps
1—4" Platt 2 stage centrifugal pump
1—5" Manistee 8 stage centrifugal pump
1—4" Layne & Bowler 10 stage sinking pump
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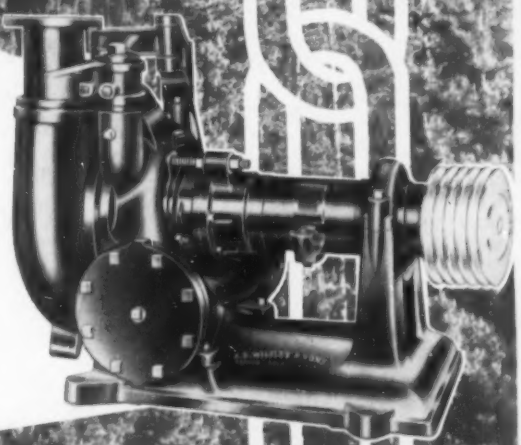

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